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THE
VICTORIAN NATURALIST:

THE JOURNAL & MAGAZINE

OF THE

Field Naturalists' Club of Victoria.

VOL. XIX.

MAY, 1902, TO APRIL, 1903.

Hon. Editor: MR. F. G. A. BARNARD.

The Author of each Article is responsible for the facts and opinions recorded.

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INDEX TO VICTORIAN NATURALIST.

VOL. XIX.

	PAGE
<i>Amytis modesta</i> - - -	103
Ants, Curious Effect of Bite of - - -	122
Argonauts, Notes on - -	28
Birchip Heterocera, Larvæ and Pupæ of 79, 132, 170	
Birds of Mud Island - -	166
Birds on Rubicon River -	77
Birds' Eggs, Australian 34, 67, 73, 91, 101	
Birds' Eggs, South African -	36
<i>Boopia bettongia</i> - - -	50
<i>Boopia minuta</i> - - -	51
<i>Boopia nota-fusca</i> - - -	50
<i>Calamanthus albivloris</i> - -	102
<i>Calyptorhynchus macrorhynchus</i> 91	
<i>Centrolepis cephaloformis</i> -	97
<i>Cetorhinus maximus</i> - 62, 123	
Cloudburst, Effect of a -	32
Coccid, A Singular Victorian	95
Conchology, Notes on Perry's	75
<i>Cymbalopora bulloides</i> -	153
<i>Destolmia lineata</i> - -	132
Dragon-flies of Alexandra -	24
Entomostraca, Records of Victorian - - -	148
<i>Eremiornis carteri</i> - -	71, 156
Field Naturalists' Club—	
Annual Report - - -	38
Conversazione - - -	84
Excursions—	
Bacchus Marsh - - -	124
Cheltenham - - -	121
Heidelberg - - -	1
Kew - - -	93
Launching Place - -	147
Mitcham - - -	37
Sandringham - -	69, 105
Shoreham "Camp-Out" 7, 107	
Exhibition of Wild Flowers	87
Game Act, Reports re - 2, 5	
Office-bearers, 1902-3 -	43

	PAGE
Field Naturalists' Club—	
President's Address -	44
Proceedings, 1, 21, 37, 53, 69, 81, 93, 105, 121, 133, 145, 157	
Rules, Alterations to 1, 22, 54	
Flinders, Geology of - -	142
Flora of Victoria, Contributions to - - -	97
Foraminifer, A Pelagic -	153
<i>Gastrophora henricaria</i> -	59
Geology of Flinders - -	142
Geology of King Island -	163
<i>Gonoides longus</i> - - -	90
<i>Gonoides retractus</i> - - -	90
<i>Harpagifer bispinis</i> - -	22
Heterocera, Birchip 79, 132, 170	
<i>Hyleora dilucida</i> - - -	158
Ibis, Notes on - - -	72, 92
King Island, Geology of -	163
<i>Latumcephalum macropus</i> -	51
Lobelias, Micro-fungi of Australian - - -	159
Mallophaga, New Species of 50, 90	
Mallee, Natural History Notes from - - -	118
Micro-fungi of Australian Lobelias - - -	159
Mosquitos and Disease 82, 87	
Mud Island, Trip to - -	166
Musical Sand at Shoreham -	114
Nautilus - - -	28
Nigeria, Some Notes on 116, 126	
<i>Ninox connirens</i> - - -	92
<i>Ninox strenua</i> - - -	92
Notes—	
Albatross, White-capped or Shy - - -	70
<i>Amytis housei</i> - - -	55
<i>Asplenium bulbiferum</i> -	122
<i>Bellis perennis</i> - - -	68
Birds, West Australian -	33
Blackbirds in Gardens -	171
Cockatoo, A New - - -	55

	PAGE		PAGE
Notes—		<i>Orthezia floccosa</i> - - -	95
<i>Dicæum hirundinaceum</i> -	49	“Perry’s Conchology,” Notes	
Eggs of Honey-eaters, &c.	123	on - - -	75
<i>Euphorbia drummondii</i> -	49	Petrel, White-faced Storm -	166
<i>Eucalyptus corynocalyx</i> -	4	<i>Phallaria ophiuraria</i> -	61
“Fat-hen” Plant -	134, 171	Phanerogams, Fertilization	
Ferns - - -	33	of - - -	98, 128
Foraminifera - - -	146	Phasmidæ, Notes on Aus-	
Frog, A Rare - - -	123	tralian - - -	138
<i>Game Act</i> - - -	94	Plants, New Districts for	
Hall, Mr. R. - - -	156	Victorian 49, 71, 104,	156
Honey-eaters and the Sugar		<i>Polytelis barrabandi</i> -	151
Gun - - -	4	<i>Polytelis melanura</i> -	152
Honey-eater, Sanguineous	92	Publications:—	
Honours - - -	155, 172	Catalogue of Nests and	
Marine Animalcules -	68	Eggs of Birds Breeding	
Microscopical - - -	172	in Australia and Tas-	
Minahs - - -	146, 172	mania - - -	51
“Monomeeth Parbine”	134, 171	<i>Emu, The</i> - - -	52, 172
Murray Cod - - -	83	Guide to Botanic Gardens,	
Musical Sand - - -	135	Melbourne - - -	66
Mutton-birds - - -	52	<i>Journal of Agriculture,</i>	
Nature Study - - -	68	Victoria - - -	67
<i>Oligorus macquariensis</i> -	83	Monograph of the Culicidæ	
<i>Pediomus torquatus</i> -	80	or Mosquitos - - -	52
Plain Wanderer - - -	80	Nature in New Zealand -	154
<i>Platycercus barnardi</i> -	4	Nature Studies in Australia	155
<i>Platycercus macgillivrayi</i> -	156	<i>Rhipidura intermedia</i> -	161
Prism Binoculars - - -	80	Rubicon River, A Day up the	77
<i>Prostanthera walteri</i> -	156	Shark, A Rare Victorian	62, 123
Pulpit Rock - - -	134, 156	Shellfish Food Remains	3, 56
Quail - - -	95	Snakes Casting their Skins	137
Shells, Abnormal Growth		<i>Spathopterus alexandre</i> -	152
of - - -	123	<i>Triniton niger</i> - - -	90
Talegallas - - -	135	Victorian Plants, New Dis-	
Tupong - - -	23	tricts for 49, 71, 104,	156
<i>Ornithobius fuscus</i> - - -	91	<i>Xylorycta homoleuca</i> -	79

ILLUSTRATIONS.

<i>Cetorhinus maximus</i> (2 plates)	62	Mallophaga, New Species of	50
Entomotraca, Victorian	150	<i>Phallaria ophiuraria</i> -	61
<i>Eremiornis carteri</i> -	71	<i>Schœnicola platyura</i> -	71
<i>Gastrophora heuricaria</i> -	89		

ERRATA.

Page 55, line 27—Strike out word “white.”	
“ 55 „ 29—Strike out word “white.”	
“ 55 „ 29—Strike out words “ <i>Threskiornis strictipennis</i> .”	
“ 72.—Strike out “white” in title of paper.	
“ 80, line 9—For “ <i>X. cryptophaga</i> ” read “ <i>Cryptophaga leucadelpha</i> .”	
“ 95 „ 32—For “ <i>macrororhynchus</i> ” read “ <i>macrorhynchus</i> .”	
“ 122 „ 18—For “ <i>lanceolata</i> ” read “ <i>lineata</i> .”	

The Victorian Naturalist.

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MAY 8, 1902.

No. 221.

FIELD NATURALISTS' CLUB OF VICTORIA.

A SPECIAL meeting of the Club was held in the Royal Society's Hall on Monday evening, 14th April, 1902. The president, Mr. T. S. Hall, M.A., occupied the chair, and about 70 members and visitors were present.

The rules, as revised by the Committee, were submitted to the meeting for adoption. Mr. G. Coghill moved and Mr. J. H. Gatliff seconded—"That the rules as now printed be adopted as the rules of the Club."

Mr. J. F. Haase moved—"That the following addition be made to the rules submitted:—'That all papers sent to the Club must be submitted to the Committee for their approval before publication.'" This was seconded by Mr. G. A. Keartland, and carried.

Mr. J. Shephard stated that it was his intention to give notice of a further alteration in the rules at the next ordinary meeting.

The ordinary meeting was then held.

CORRESPONDENCE.

From the hon. secretary of the Engineering Students' Society, Melbourne University, inviting members to attend a lecture by Prof. J. W. Gregory, D.Sc., F.R.S., at the University, on Thursday, 24th April, entitled "A Journey Round Lake Eyre."

REPORTS.

A report of the Club's excursion to Heidelberg on Saturday, 15th March, was read by the leader, Mr. J. Shepherd, who said that, the object of the excursion being pond life, the lagoon near the bridge over the Yarra, and, by the courteous permission of Mr. R. Laidlaw, that in the grounds of Springbank, were visited. Two unnamed species of *Brachionus* were found in much greater numbers than on previous visits, and among other species taken were the Rotifer *Lacinularia elongata*, some fine colonies of Polyzoa, and a single specimen of Pedalion. A pleasant and interesting afternoon was spent by the members who took part in the excursion.

A detailed report of the Club's Easter camp-out at Shoreham, Western Port Bay, from Friday, 28th March, till Tuesday, 1st April, was read by Mr. J. A. Kershaw, who stated that a most enjoyable and profitable time had been spent by the party during their five days' outing. The time was devoted almost exclusively to working the reefs and shores of that part of the bay, with most satisfactory results. Detailed reports on the various branches

touched on were furnished by several of the members who attended.

A report was read by Mr. G. A. Keartland on the work done by the sub-committee appointed by the Club to draw up a list of suggestions for the assistance of the Minister before any alterations were made in the existing *Game Act*. The sub-committee reported that nearly 300 printed circulars, containing several questions to be answered, were issued to various sportsmen, and a large number of these had been returned with the replies filled in. Out of forty-five leading sportsmen in various parts of the State, only one stated that he had not found young quail at the opening of the season. Thirty stated that they had found the birds still breeding, and twenty-five recommended the alteration of the date of opening the shooting season from 1st March to 1st April. Nearly all the replies favoured the opening of the shooting season for ducks on the 1st February, as very few of the young birds can fly by the 20th December. Finally a conference was held at which representatives of the Royal Agricultural Society, sportsmen, bird dealers, and fruit-growers, together with the Club's sub-committee, were present, when the list and suggestions submitted by the sub-committee was adopted by the conference, and it was suggested that a deputation, consisting of the representatives above mentioned, together with the president and secretary of this Club, should wait on the Minister and urge the adoption of the list as amended.

Messrs. A. Coles, A. J. Campbell, and A. E. Kitson discussed the report.

Mr. D. Le Souëf moved—"That the sub-committee endeavour to arrange for a deputation to the Minister, and that the President and Secretary attend."

On the motion of Mr. G. Coghill, seconded by Mr. J. H. Gatliff, Mr. Keartland was accorded a hearty vote of thanks for the valuable work he had done in connection with this matter.

The hon. librarian reported the receipt of the following donations to the library:—*Journal of Agriculture*, Victoria, February and March, from the Department of Agriculture, Victoria; "Fungus Diseases," by D. M'Alpine, from the author; "Proceedings Royal Society of Victoria," part 2, 1902, from the Society; *The Wombat*, March, from the Geelong Field Naturalists' Club; *The Emu*, April, from the Australasian Ornithologists' Union; "Report on the Kiandra Lead," from Department of Mines, New South Wales; "Notes on the Botany of Pitcairn Island," by J. H. Maiden, F.L.S., Sydney, from the author; "Insects and Insect Lore," by J. G. O. Tepper, F.L.S., Adelaide, from the author; *Nature Notes*, February, from the Selborne Society, London; *Knowledge and Science Gossip*, February and March, from the proprietors.

ELECTIONS.

On a ballot being taken, Mr. C. A. Robinson, 257 Auburn-road, Auburn, was elected an ordinary, and Mr. H. Ernest Gatliff a country member of the Club.

The President took the opportunity of mentioning the return of our fellow member, Professor W. Baldwin Spencer, M.A., F.R.S., who, with Mr. F. J. Gillen, had spent some twelve months among the aborigines in the interior of Australia, and had brought back a very valuable collection of material for future work.

Mr. D. Le Souëf moved, and Mr. G. B. Pritchard seconded—"That Professor Spencer be congratulated on the successful results of his recent expedition."

PAPERS.

1. By Mr. D. Le Souëf, C.M.Z.S., entitled—"Shell-fish Food Remains of Australian Aborigines."

In a very interesting paper, illustrated with some very good lantern views, the author drew attention to the large quantities of broken shells which are to be found on many parts of the Victorian coast, which he contended were the remains of shell-fish gathered by the aborigines for food, and were the accumulation of many years. The author stated that many deposits, which were commonly supposed to be raised beaches, would be found to be the remains of kitchen-middens formed by the natives, and suggested that further research should be made in suitable localities.

In discussing the paper Mr. G. A. Keartland mentioned that he had found the aborigines on the Fitzroy River, North-Western Australia, engaged in collecting mussels, which they boiled, and on going to their camp found a deposit of some ten or fifteen drayloads of these shells, forming the results of many years' collecting.

Mr. G. B. Pritchard could not altogether agree with Mr. Le Souëf's conclusions, being of opinion that the kitchen-middens were not so common as stated, and discussed the possibility of the shells being blown up to the top of the cliffs by strong winds.

The president (Mr. T. S. Hall) stated that there was no doubt as to the extent of country covered with the middens, and mentioned several instances where these occur in Victoria, some of which contained enormous quantities of shells, most of which had been broken, evidently by the aborigines, and which must have taken hundreds of years to collect.

Messrs. G. Coghill, A. E. Kitson, and F. Wisewould also discussed the paper.

Owing to the lateness of the hour the remainder of the papers on the notice paper had to be postponed.

On the motion of Messrs. J. Stickland and D. Le Souëf, a vote of thanks was accorded Mr. J. Searle for again placing his lantern at the disposal of the Club.

NATURAL HISTORY NOTES.

Mr. G. A. Kearland mentioned that a specimen of Barnard's Parrakeet, *Platycercus barnardi*, which was almost exclusively a dry country bird, had been seen recently at South Brighton.

Mr. C. French, jun., read the following extract from a letter received from a correspondent residing in the Wimmera District :—
 "A short time ago, in the garden here, there were great numbers of New Holland Honey-eaters ; but eating the blossoms of the Sugar Gum, *Eucalyptus corynocalyx*, apparently killed them all, as they were found lying dead all over the garden. I feel sure it was the Sugar Gum tree blossoms that killed them, for a friend of mine who had a Rosehill Parrakeet gave it some of the blossoms, with the result that the parrakeet died in a very short time."

EXHIBITS.

By Mr. E. Anderson.—Drawing of moth, *Gastrophora henricaria*, at rest ; specimens of *Phallaria ophiusaria*, photograph of larvæ, and sketch of moth at rest.

By Mr. A. Campbell, jun.—Skins of Mutton-bird or Short-tailed Petrel, *Puffinus tenuirostris*, showing young in down and in first coat of feathers ; also Penguin, *Eudyptula undina*, Gld., showing young in different stages of plumage.

By Mr. A. Coles.—Pair of White-throated Nightjars, *Eurostopus albigularis*. The male was shot at Bulla on 5th April, and the female at Beaconsfield on 28th March. This species is rarely met with.

By Mr. C. French, jun.—Two new Victorian scale insects—*Eriococcus sordidus*, Green, on *Helichrysum ferruginum* ; and *Aspidiotus immaculatus*, Green, on *Styphelia*, sp.

By Master C. French.—Rare eggs of White-eyebrowed Water Crake, clutch of six, from Northern Australia.

By Messrs. S. W. Fulton and F. E. Grant.—Crustaceans collected during Club's camp-out at Shoreham.

By Mr. R. Hall.—Salps preserved 2½ years ago in formol 4 per cent. and in methylated spirit 50 per cent. ; locality, Southern Ocean.

By Mr. A. D. Hardy.—Specimens of Asbestos changed by replacement by Silica, and with parts apparently fused, from Casterton district ; Asbestos from Beaconsfield, Tasmania ; and Graphite from Castlemaine, Victoria.

By Mr. J. A. Kershaw.—Marine animals of various kinds collected during Club's camp-out at Shoreham.

By Mr. A. E. Kitson, F.G.S.—Shell-bearing clay from black clay band above basalt in the new cut at the Yarra Improvement Works, near Botanical Gardens, Melbourne.

By Mr. D. Le Souëf, C.M.Z.S.—Samples of shells, native tomahawk, knife, and other implements found on native kitchen-middens, in illustration of paper.

By Mr. W. J. M'Caw.—Marsupial Mouse, *Sminthopsis murina*, alive, from Broadmeadows.

By Mr. G. B. Pritchard.—Case of shells and case of minerals collected during Club's camp-out at Shoreham; also a series of photographs taken at the same time.

By Mr. E. O. Thiele.—Minerals and shells collected during the Club's camp-out at Shoreham.

By Mr. C. Walter.—Plant, *Galenia secunda*, Sonder, N.O. Ficoideæ, not previously recorded from Australia. Collected by E. E. Pescott at Corio Bay, Victoria, January, 1901. All the other species of this interesting genus (flowers without corolla) are restricted to Cape of Good Hope, S. Africa. Plant, *Chenopodium triangulare*, R. Brown, N.O. Salsolaceæ, from E. Gippsland, Victoria, being a new locality; collected by E. E. Pescott.

After the usual conversazione the meeting terminated.

REPORT OF SUB-COMMITTEE *re* GAME ACT.

It will be remembered that at the meeting of this Club held in July last attention was called to some of the anomalies in the *Game Act*, and also to the necessity of making several alterations in the schedule. After considerable discussion a resolution was carried—"That steps be taken to form a committee representing the various interests of naturalists, sportsmen, agriculturists, and bird-dealers to draw up a list of suggestions for the assistance of the Minister administering the *Game Act* before any alterations are made in the existing Act," and Messrs. Robt. Hall, G. A. Keartland, and D. Le Souëf were appointed a sub-committee to carry out the resolution.

A circular was drawn up and posted to all sportsmen whose addresses could be ascertained, asking the four following questions:—1. Have you noticed many young birds at the opening of the quail and duck shooting season? 2. What dates do you favour for opening and closing the quail shooting season? 3. What dates for opening and closing the shooting season for ducks? 4. Can you suggest the names of three representative gentlemen whom we could invite to act on the committee?

Nearly 300 circulars were issued, and 105 returned with replies to the questions, and in many cases accompanied by letters. Unfortunately some of these circulars, although filled in, were unsigned, and were consequently rejected as unsatisfactory. Had all been properly signed the position of the sub-committee would have been very much strengthened. As matters stand, out of 45 leading sportsmen, scattered in all parts of the State, only one stated that he had not found young quail at the opening of the season. Thirty-four state that they have found the birds still breeding, and fill in their replies with such answers as "Yes, plenty;" "Fully one-third of the birds were too young to

fly;" "Yes, young birds and eggs in numbers." Twenty-five recommend the alteration of the date of opening the shooting season from 1st March to 1st April. This is advisable on more grounds than one. The birds are not only breeding, but the weather is so hot that most of the birds killed are bad before they can be used, and the dogs are unable to work, as they become exhausted, and scent will not lie long after sunrise. Thus the sportsman is deprived of his chief pleasure in seeing his dogs in work. Several writers, whilst admitting the presence of many young birds in March, object to prolonging the close season on the ground that so much illegal shooting is carried on that it simply means letting the poachers have the whole of the sport. Some of the writers complain in no uncertain manner about persons who ought to enforce the law being the chief offenders. With regard to the ducks, nearly all the replies are in favour of opening the shooting season on 1st February, as very few of the young birds can fly by 20th December, and the weather is so hot that those shot become bad before they can be utilized.

With this information in hand your sub-committee decided to invite the co-operation of the Royal Agricultural Society, which body appointed Mr. Job Smith (president) and Mr. Geo. Chirnside as their representatives on the committee. The *plebiscite* of sportsmen nominated Mr. W. T. Coldham, Mr. John Clark, and Dr. Chas. Ryan. Mr. W. Cooper was asked to represent the bird-dealers, and Mr. Geo. E. Shepherd the fruit-growers. The date of the conference was fixed for Wednesday, 26th March, in the council room of the Royal Agricultural Society. At the last moment Mr. Chirnside sent an apology, and Mr. Thomas Patterson (secretary of the Royal Agricultural Society) was appointed to fill his place. As Mr. Coldham was also otherwise engaged, Mr. T. G. Pearson was invited to act in his stead, your representatives being all present.

After Mr. J. Smith had been voted to the chair, the business was introduced by Mr. Keartland. It was then decided to take the items in the schedule *seriatim*, and the list as agreed upon stands thus:—

To be Protected the Whole Year.

All Australian Fauna (except snakes) in the National Park, Wilson's Promontory.

Antelopes, Deer, Kangaroos (large grey, *Macropus giganteus*, and large red, *Macropus rufus*), Native Bears, Platypus, Seals.

Acanthizas (all species), Babblers (all species), Bee-eaters, Bustard or Wild Turkey, Californian Quail, Coachwhip-birds, Cuckoos (all species), Emus, Egrets, Ephthianuras, Fantails, Flycatchers, Great Kingfisher or Laughing Jackass, Grouse, Harmonious Shrike-Thrush, Larks (all species), Lyre-birds, Magpies, Magpie Larks, Martins, Mountain Thrushes, Nightjars, Owls

(all species), Partridges, Pheasants, Podargus or Mopokes, Robins (all species), Shrike-Tits, Sittellas, Southern Stone Plovers, Spotted Ground-Thrush, Swallows, Swamp or Ground Parakeet, Swifts, Thickheads (all species), Tree-creepers, Warblers, Wedge-bills, White Swans, Wood Swallows, Wrens, English Skylark, English Thrush.

From 1st day of June to last day of December.

Opossums (all species.)

From 14th day of June to 20th day of December in each year.

Black Swans, Magpie or Semipalmated Geese, Cape Barren or Cereopsis Geese.

From 1st day of August to 20th day of December in each year.

All birds known as Cranes or Herons, all Kingfishers other than the Laughing Jackass, all members of Graucalus family, Avocets, Bitterns, Black Cockatoos, English Blackbirds, English Goldfinches, Gang Gang Cockatoos, Ibis (all species), all other members of the Rail family (Porphyrios, Coots, Gallinules, &c.), Mallee Hens, Black-breasted and Spurwinged Plovers, Stilts.

From 1st day of August to last day of January following.

Wild Duck (all species), Teal, Wood Duck or Maned Geese.

From 1st day of August to last day of March following.

Bronze-winged or other Wild Pigeons, Quail, and Hemipodes.

The sub-committee is desirous of acknowledging the kindness of the Council of the Royal Agricultural Society in placing its rooms at the disposal of the Conference, and otherwise materially assisting the movement.

G. A. KEARTLAND,

On behalf of the sub-committee.

THE SHOREHAM "CAMP-OUT."

OWING to the unusually heavy downpour of rain which fell during the two days prior to the date of the Easter camp-out, the prospect of a successful trip looked decidedly unpromising, and especially so to the two members of the party who started a day in advance to make the necessary arrangements for the five days' camp.

Leaving Melbourne by the 8.10 a.m. train on Thursday morning, 27th March, the advance party had a most dismal journey to Bittern, the rain falling in a continuous heavy downpour, which only increased as its destination was neared. At Bittern station the collection and transfer of our luggage to the cab, and other necessary matters, were carried out in a drenching rain which severely tested our waterproof coverings.

A light breakfast having been disposed of, we took our places

in the covered cab awaiting us (after draining the water off the seats) and started on our eleven-mile drive through a heavy driving rain, with the water forcing itself in through every crevice and saturating everything inside. The roads were in many places completely covered in water, while the creeks which we passed on our way were transformed into rushing torrents. Fortunately it had been decided to camp in an empty house, which had been secured for us through the kind services of our fellow-member, Mr. S. W. Fulton, in preference to living under canvas, and this forethought was greatly appreciated under the circumstances. On reaching our destination a start was immediately made to make things comfortable. With the assistance of a few tools, some stray pieces of timber, and a door, a table and seats were soon constructed, and by nightfall everything was in readiness for our party, who we were trying to persuade ourselves would not consist of our two selves only. However, we determined to make the most of our time during our stay, and notwithstanding the storm, which threatened to leave us roofless, we had a good night's rest. Rising early on Good Friday morning we were much relieved to find the rain had ceased, and there was a prospect of fine weather after all, which gave us an opportunity to view the surrounding country.

Shoreham is a small farming district situated on Western Port Bay, about 53 miles S.E. of Melbourne, and is reached by train to Bittern, 42 miles, thence by coach about 11 miles along the main road to Flinders. The spot secured for our camp was most happily chosen, the house, containing 8 or 9 rooms, being situated on the side of a steep hill immediately overlooking and commanding a beautiful view of the bay, showing Phillip Island just opposite, with French Island away to the left, while standing out prominently at the entrance to the western passage to the bay, some 4 miles to the right, was West Head. The Nobbys and Seal Rocks were plainly to be seen off the western point of Phillip Island, while the position of Cape Woolamai could just be made out away to the south-east.

Two or three minutes' walk down the hill brought us on to a broad sandy beach near the jetty, on either side of which was exposed at low water a broad low-lying reef, running out into the bay for a considerable distance. Here we decided to devote as much of our time as the tide would allow us, and, after a few minutes' work among the loose boulders, were delighted with the prospect of having a really good time among the innumerable marine animals which were to be found under the loose rocks and in the small pools left by the receding tide.

Among the first specimens collected were the broad, flat marine Planarians, which occurred plentifully on the under side of the rocks near the shore, while the common speckled crab, *Chas-*

mognathus quadridentatus, was to be found almost everywhere. Further out on the reef the rocks when overturned presented quite an animated appearance, owing to the numerous marine forms of animal life which they revealed. Chætopod or Bristle-worms, in their curious shell and sand covered tubes, or partly embedded in the mud; Sea Anemones, Ascidians, Sponges, and occasionally specimens of the well-named Brittle Stars were to be seen, in company with Sandhoppers, crabs of various kinds, Chitons, and other shells. We were, however, allowed but a short time on the reef, as the incoming tide quickly caused us to retreat to the shore, where we spent the remainder of the morning searching among the masses of seaweed, &c., which had been washed up.

On adjourning to the house for lunch we were just in time to welcome the arrival of eight of the expected members of our party, and with the addition of one more on the following day we made a party of eleven, being:—Messrs. S. W. Fulton, F. E. Grant, T. S. Hall, M.A., F. W. Irving, V. R. M'Nab, G. B. Pritchard, H. Summers, A. O. Thiele, E. O. Thiele, and G. Weindorfer, with J. A. Kershaw as leader.

Owing to the absence of our cook, who disappointed us at the last moment, the culinary arrangements during the camp were admirably supervised by Mr. Fulton, who found plenty of willing assistance and advice among the remainder of the party.

After making ourselves as comfortable as possible for the remainder of our stay, and preparing our collecting outfits, &c., a hearty dinner was disposed of and a start made for the beach. Two of the party decided to work along the beach towards Flinders, while the remainder took the opposite direction for Shelly Beach, a walk of some three miles. The shore for some distance is bounded by steep cliffs, broken here and there with short, deep gullies, worn by the soakage from the land above. A series of small bays are formed between the rugged basaltic prominences which jut out here and there, being continued for some distance into the sea by long reefs. During low tide the water in places recedes for a considerable distance, leaving these reefs exposed and dry, but which were now completely covered by the full tide. At the base of some of these cliffs a large quantity of loose waterworn stones of various sizes were washed up, and as the waves broke over these and receded again it produced a most peculiar rattle, which gave some idea of the amount of erosion which must be going on. As we proceeded the rocks disappeared, leaving a long stretch of flat sandy beach, bordered with Banksias. The beach was here strewn with dense masses of seaweed, with very few shells to be seen, though a number of Tunicates, Holothurians, and Echinoids were noticed. On rounding a rocky point known as Honeysuckle Point, which runs

out for some distance into the Bay, we reached Shelly Beach. This we were assured was one of the best spots for shells along the shore, but with the exception of a rather broken specimen of *Pinna tasmanica*, a few worn shells of *Haliotis albicans* and *H. emmæ*, and a well-preserved specimen of the Sea Urchin, *Goniocidaris tubaria*, nothing of importance was secured. This was, however, recognized to be owing to the recent storm. A return was then made to the camp, which was reached before dark, where we found the remainder of our party awaiting us. After a well-earned tea, which we all did ample justice to, our specimens were brought out, sorted, and otherwise attended to, and the remainder of the evening was spent in conversation around a good fire, which the coolness of the evening permitted us to enjoy.

Rising early on Saturday morning, with the sun just peeping over the horizon, breakfast was got over, and the whole party made their way to the reef close by, where we were all soon busily engaged. Keen interest was taken in the work, and, as is usual with our Club excursions, each one generously studied his fellow-members' interests as well as his own. By working with the ebb tide we were able to devote a good deal of time on the reef, and full opportunity was taken to make the most of it. A number of interesting shells were secured, while the crustaceans had a most restless time. Even the unexpected breaking of a portion of decomposed rock, and the equally unexpected immersion in the pool, causing a great displacement of water, did not damp the ardour of one of our most energetic companions, who simply regarded it as part and parcel of the day's work. In some of the small pools several of the curious Sharp-nosed Crabs, with their seaweed coverings, were found, but it was only the experienced eye which detected them, so closely did they resemble their surroundings.

Among the Polychæte worms several fine specimens of the large iridescent Bristle-worms, belonging to the family Eunicidæ were found, in their tubular coverings, and required careful handling, owing to their liability to wriggle themselves into several pieces, and a number of other smaller forms, such as Cirratulus, with its long thread-like segmental appendages; Polynœ, with their curious soft dorsal scales, very common near the outer edges of the reef, and a number of other forms equally interesting. A lovely specimen of a Sabellid Worm was secured, in its flexible, leathery tube, which measured about 9 or 10 inches in length, the animal itself being about $4\frac{1}{2}$ inches long without the crown. The large branchial crown, consisting of a considerable number of filaments about 2 inches long, and attached to a semicircular base, was a beautiful sight when expanded in the water. The ugly-looking shell-fish *Scutus anatinus*, varying in size from 1 to 3 inches long,

was plentiful, and a number of small fish of various kinds, but which have not yet been determined, were captured in the shallow pools.

After lunch some of the members started for Flinders, while the remainder followed in the same direction later on. The beach was more or less covered with seaweed, which in some places was piled up in dense masses to a depth of about 3 feet, while here and there great boulders of basalt were scattered about the base of the cliffs. In places enormous quantities of a species of simple sand-covered Tunicate (*Molgula*, sp.) were distributed along the beach, crackling under our feet as we walked along, and a number of Holothurians, some of which were very large and had an objectionable habit when handled of ejecting a part or the whole of their internal anatomy. Good specimens of the common Sea Urchin, *Strongylocentrotus erythrogrammus*, were plentiful, and several other species were noticed, including the oval-shaped *Echinocardium australe*. Shells were, however, very scarce, those seen being mostly more or less broken specimens of *Haliotis nævosa*, *albicans*, and *emmcæ*, though a few good species were collected. Nearing Flinders a good-sized creek emptied itself into the sea, and contained a number of small freshwater fish (*Galaxias*). Here some profitable work might have been done had time permitted, but this was left for a future visit. On reaching Flinders we were joined by our companions, who had been successful in finding some good shells, and, after a short stay, started for home, which we reached about dark, thoroughly tired out with our long day's work.

Sunday morning was devoted to working a reef about a mile from the camp, with good results; and in the afternoon, the tide being in, members dispersed in various directions—some to search the shore, others to try the dredge from the jetty, while one member devoted the afternoon to the search for entomological and other specimens inland, with not very much success. In a short, deep gully running down to the beach, a number of fine Tree Ferns, *Alsophila australis*, were discovered, also several smaller kinds, such as Maidenhair, a Polypodium, *Lomaria discolor*, &c. Three or four specimens of an orchid, *Eriochilus autumnalis* (?), were found in flower, and a large quantity of mushrooms were discovered close to the camp, which were a valuable addition to our larder and were greatly appreciated.

On Monday some of the party arranged to spend the day at the zeolite beds, some 3 miles beyond Flinders, while another party engaged a boat for a day's dredging. One member spent a very profitable day among the Algæ which so plentifully lined the shore, while another, after working for some time on one of the reefs, started off on another visit to Shelly Beach. All had good reason to be satisfied with the results of their work.

The dredging party returned shortly before dusk, well laden with material, which had been dredged off Honeysuckle Point in between 4 and 5 fathoms. This had been sifted and bagged for more careful examination during the evening. The geologists put in an appearance shortly afterwards, with heavy bags and good reports of satisfactory results. Tea was soon disposed of, and the tables quickly cleared for work. The shelly material was then distributed in several heaps on the table, and, with all the available lights in use, the majority of the members settled down to thoroughly examine and sort the heaps. These consisted mainly of small shells; but a number of the interesting little Lancelet (*Amphioxus*), which were dredged in numbers, were still wriggling about, and several of the very small Echinoid, *Microcyphus zic-zac*, Ag., were picked out. A number of crustaceans were also dredged up, many of which were very desirable species.

It was decidedly interesting work, and a great advantage to be able to do it under such comfortable circumstances. A good amount of useful material was obtained in this way, and when the last heap was finished, shortly before midnight, everyone was well pleased with the results obtained.

Tuesday being our last day in camp, the majority of the party decided to pay another visit to Shelly Beach, after which they intended to proceed across country to the main road, where they would be overtaken by the vehicles on their way to Bittern. Leaving their luggage all ready for transfer to the station, the excursionists started off on their long walk, the remainder of the party staying behind to put the finishing touches to what proved to be a most enjoyable and profitable camp-out.

About 4 o'clock the vehicles were loaded up, and a start was made for the station. On reaching Balnarring, some 3 miles from Bittern, we found our friends enjoying a cup of tea, and thoroughly pleased with the very good results of their last visit to Shelly Beach, which, it had to be admitted, well deserved its name and reputation. The majority of the excursionists elected to walk the remaining distance to the station, which was reached in good time for the evening train. A reserved compartment having been secured, we travelled in comfort to Melbourne, which was reached about 10.30 p.m., after a most enjoyable outing, our only regret being that so many of our members were unable to share it with us.

I append brief reports on the ornithology and entomology, and am indebted to other members for reports dealing with their respective branches:—

ORNITHOLOGY.—No special attention was devoted to this subject, but the following birds were noticed during our stay, mostly in the vicinity of the camp:—Sparrow Hawk, Brown

Hawk, Kestrel, Magpie Lark, Grey Shrike-Thrush, Scarlet-breasted Robin, Black-faced Graucalus or Cuckoo-Shrike, White-eyebrowed Pomatorhinus or Babbler, Butcher-bird, Rufus-breasted Thickhead, White-bearded Honey-eater, White-plumed Honey-eater, Garrulous Honey-eater or Minah, Welcome Swallow, Brown Kingfisher (Laughing Jackass), Rosella, Bluebellied Lorikeet, White-breasted Cormorant, Pacific or White-necked Heron, Silver Gull. Several other birds were seen, but not closely enough for identification.—J. A. KERSHAW.

ENTOMOLOGY.—Although late in the season a fair number of Lepidoptera were about, many of which I was rather surprised to find at this time of the year. Many of the species which I expected to find—such as *Chlenias*, *Trictena*, *Pielus*, and others—were not seen at all. Most of the species collected were well-known and common forms, but a good male specimen of the rare moth, *Orgyia semifusca*, Walk., was found just as we were leaving, and a few other desirable species, such as *Zonopetala quadripustulata*, Walk., *Istarva scitisignata*, Walk., and others, were collected. A well-marked specimen of the well-known Skipper, *Hesperilla donnysa*, Hew., was seen flying about the outer edge of a reef, and eventually flew away seawards, but whether it would reach Phillip Island or not it was impossible to say. Three species of Rhopalocera were flying about in fair numbers—*Xenica klugii*, Guer., *X. achanta*, Don., and *Pyrameis kershawii*, M'Coy.

Of Coleoptera about 20 species were collected during the few hours devoted to this branch. These were chiefly common forms, but a few rather good species were taken, and among these were a few Curculios, found among the rocks on the outer edge of the reefs, where, during full tide, the water is several feet deep. These were all alive, though frequently partly submerged in the pools. Another species of Curculio, *Aphela algarum*, Pasc., was found similarly situated.

Several spiders were also seen running over the rocks, far from shore.

The following are some of the entomological specimens collected :—Lepidoptera.—*Cluaca rubricosta*, Wk. ; *Scoliacma bicolor*, Bdv. ; *Mosoda sejuncta*, Feld. ; *Epidesmia chilonaria*, H.S. ; *Heliocausta parthenopa*, Meyr. ; *Scoparia philonephes*, Meyr. ; *Ectropis pristis*, Meyr. ; *Dipterina tasmaniae*, Walk. ; *Strepsiceros macropetana*, Meyr. ; *Cacœcia jugicolana*, Meyr. ; *Talis opulentellus*, Zell. ; *T. gramellus*, Zell. ; *Mecyna polygonalis*, Hb. Coleoptera.—*Sarathrocrepis civica*, Newm. ; *Heteronyx jubatus*, var., Blkb. ; *Hapatesus hirtus*, Cand. ; *Lacon caliginosus*, Cand. ; *Edemera dorsalis*, Klug ; *Chalcopterus variabilis* ; *Cryptorhynchus mæstus*, Boh. ; *Deretaphrus erichsoni*, Newm. ; *Platusis australis*, Hope ; *Haltica pagana*, Blkb. ; *Paropsis*

trimaculata, Chp. ; *P. nigerrima*, Germ., var. ; *P. lineata*, Marsh. ; *Aphela algarum*, Pasc.—J. A. KERSHAW.

MOLLUSCA.—Conchologically speaking, the neighbourhood of Shoreham is a veritable paradise, for not only is there an abundance of species that can be closely examined in their natural habitat, but a large number of rare and beautiful forms may be obtained here with ease that appear, so far as present investigation has gone, to be entirely absent from other parts of our coast. Whilst collecting here one cannot help being struck by the difference in Port Phillip, many species extremely common in the latter place being uncommon in Western Port, and *vice versa*, but for richness in species Western Port is easily first. Of course allowance must be made for variations in quality of any shell-collecting ground, differences in wind and tide having considerable effect. This was well exemplified when we first arrived at Shoreham, many of our party being extremely sceptical about the locality being favourable for shells, and our work at first was confined to collecting living species under the rocks at low tide, but after a few days of natural sorting by quieter waters in the bay, a splendid lot of material began to wash up on some of the beaches, and, to our regret, we had to leave when there was every prospect of daily improvement. The results from the few days at our disposal speak for themselves in that the material obtained, as far as I have been able to summarize it, includes representatives of at least 135 genera and 253 species. Here the contrast with Port Phillip can be clearly seen, for it takes considerable time and patience to secure even from the best beaches anything upwards of 100 species.

Amongst the families that may be stated to be specially represented we have the Marginellidæ, Columbellidæ, Pleurotomidæ, and Trochidæ.

The genera most worthy of mention are Colubraria, Zemira, Lyria, Ancilla, Cancellaria, Eunaticina, Mitrularia, Adeorbis, Crossea, Astele, and Gena.

The more interesting species obtained were :—

Murex australis, Quoy and Gaimard	Cancellaria spirata, Lamarck
Murex angasi, Crosse	Terebra albida, Gray
Colubraria bednalli, Brazier	Terebra kieneri, Deshayes
Zemira australis, Sowerby	Margilia adcocki, Sowerby
Voluta undulata, Lamarck	Margilia alucinans, Sowerby
Lyria mitræformis, Lamarck	Raphitoma harrisoni, T. Woods
Marginella flindersi, Pritchard and Gatliff	Conus rutilus, Menke
Olivella leucozona, Adams and Angas	Conus segravei, Gatliff
Columbella cominellæformis, Tate	Erato denticulata, Pritchard and Gatliff
	Natica sagittata, Menke
	Natica shorehami, Pritchard and Gatliff

Eunaticina umbilicata, Quoy and Gaimard	Calliostoma hedleyi, Pritchard and Gatliff
Mitrularia equestris, Linnæus	Astele subcarinata, Swainson
Adeorbis vincentiana, Angas	Gena nigra, Quoy and Gaimard
Crossea concinna, Angas	Aspergillum strangei, A. Adams
Liotia australis, Kiener	Pectunculus radians, Lamarck
Liotia subquadrata, T. Woods	Leda crassa, Hinds
Turbo gruneri, Philippi	Meroe aliciae, Adams and Angas
Leptothyra rosea, T. Woods	Chione undulosa, Lamarck
Astrarium squamiferum, Koch	Pinna tasmanica, T. Woods
Clanculus undatus, Lamarck	Solemya australis, Lamarck
Clanculus dunkeri, Koch	Limatula bullata, Born
Clanculus ochroleucus, Philippi	Mactra pura, Deshayes
Bankivia fasciata, Menke	Mytilus ater, Frauenfeld
Gibbula coxi, Angas	Venerupis exotica, Lamarck
Calliostoma meyeri, Philippi	
Calliostoma incertum, Reeve	

G. B. PRITCHARD.

CRUSTACEA.—The collection of Crustacea made during the camp-out was on the whole very satisfactory. The long rocky ledges which here occur on the coast, and which are uncovered at low tide, form an excellent collecting ground, and by wading in the water just below tide mark, and turning over the stones (an operation which needs some care, as many of the stones are rotten, and the collector finds himself seated somewhat hurriedly in a saltwater bath up to his neck, and he will do well to leave watch and valuables behind when hunting crustacea), a number of the rarer forms were found, this being the zone of marine life which has probably been least worked on our Australian coasts.

In some of the rocky pools the Long-nosed Crabs, *Oxyrhyncha*, were found in fair numbers. These beasts deck themselves out with pieces of seaweed, similar in form and colour to those growing in the pools in which they live, and are consequently difficult of detection to an untrained eye. After turning over a stone and watching it, what looks like a small bunch of seaweed will suddenly become animated and start walking away, and on examination it will be found to be a "long-nosed" dressed in seaweed. The forms taken were *Halimus truncatipes*, *Miers* (exceedingly large specimens), *Halimus tumidus*, *Dana*, *Huenia bifurcata*, *Streets*, *Micippoides longimanus*, *Hasw.*, and others. The results of the dredging excursion, although not numerous, were also of interest—one of the forms taken, a *Porcellana* allied to *P. transversa*, *Hasw.* (if not identical with it), which has not previously been recorded from our coast. A number of shrimps (*Macrura*) were also taken, some of which still await identification.

In digging in a muddy flat, which was uncovered at one point of the beach at low tide, some of the burrowing shrimps were

taken, viz., *Upogebia simsoni*, Thompson, previously recorded by us from Western Port, and a species of *Callianassa*, which we believe to be undescribed.

Of the Macrurous forms taken, those worthy of mention are *Betaeus australis*, Stimpson, taken below tide marks; *Alpheus vilosus*, Olivier; *Palæmon affinis*, M. Edw.; and another *Palæmon*, apparently *P. ornatus*, Olivier. The ordinary shore crabs were not found to be so numerous as we had previously noticed them in this locality; but *Chasmagnathus quadridentatus*, M.-Edw., *Hetrograpsus octodentatus*, M.-Edw., *Philyra levis*, Bell, *Cyclygrapsus punctatus*, M.-Edw., *Litocheira bispinosa*, Kinahan, and others were there in fairly large numbers. It is also worthy of mention that *Pinnotheres pisum* was found living within the shells of both *Mytilus latus* and *Modiola australis*. A large number of Hermit Crabs were found in the rock-pools, comprising the forms *Paguristes frontalis*, M.-Edw., *P. subpillosis*, Hend., and *Eupagurus lacertosus*, Hend. We also obtained a number of the lower forms of Crustacea, Amphipoda, Isopoda, &c., which have been handed over to Mr. O. A. Sayce, who is working at these groups; also Starfishes and Sea Urchins, which have been handed over to Messrs. Mattingley and Cummins. In all we obtained at least some seven species new to our Victorian record.—S. W. FULTON, F. E. GRANT.

ALGA.—The following seaweeds were collected at Shoreham and have been identified by Mr. H. T. Tisdall:—

Fucoideæ:—*Carpomitra caudata*, Sond.; *Cystophora paniculata*, Aresch.; *Seirococcus axillaris*, Grev.; *Sargassum verrucolosum*, J. Ag.; *Sargassum trichophyllum*, J. Ag.; *Sargassum phyllanthus*, J. Ag.; *Fucodium chondrophyllum*, J. Ag.

Florideæ:—*Gelinarina harveyana*, J. Ag.; *Nitophyllum revoluta*, Harv.; *Plocamium pressianum*, Sond.; *Hymenocladia usnea*, J. Ag.; *Ptilota articulata*, J. Ag.; *Wrangelia velutina*, Harv.; *Champia tasmanica*, Harv.; *Corynecladia australasica*, Sond.; *Polysiphonia cladostephus*, Mont.; *Polysiphonia hystrix*, Harv.; *Collophyllis carnea*, J. Ag.; *Collophyllis lambertii*, Hook.; *Griffithsia sonderiana*, J. Ag.; *Dictyurus quercifolius*, J. Ag.

Zoospermeæ:—*Ulva latissima*, J. Ag.; *Caulerpa hypnoides*, R. Br. Altogether 23 species.—G. WEINDORFER.

GEOLOGY.—There is not much to be said of the geology of the neighbourhood, and the members of the party were too busy collecting to devote much attention to it. Selwyn examined the district in the early days of the colony, and nothing of much importance has been published since his map, of which two editions were issued. In the earlier the whole of the country about our camp is coloured 'Tertiary and Modern Volcanic rock,' and a note reads:—"Cliffs of hard dark Basalt with bands of soft red earthy Porphyritic rock, presumably beds of Volcanic

mud. Crystals of Carbonate of Lime, Quartz, and Olivine in cavities, and a soft, white Steatitic mineral in the earthy beds giving the rock a marbled and porphyritic appearance."

In the edition published in 1856 this note is omitted, and there is a slight alteration in the colouring. The whole area is referred to "Basalt Amygdaloid and Old Igneous Rocks." With regard to the minerals Selwyn records I leave Mr. Pritchard to speak, only remarking that we found no included quartz. About a mile west of West Head an outlier of polyzoal limestone occurs, probably of Jan Jucian age. This is a well-known locality for fossil sponges, which occur in profusion. The limestone lies in a depression in the volcanic rock. Travelling down from Bittern we were for a long time on sands and clays, which are probably in part of Balcombian age, but may be younger, and in many places undoubtedly are redistributed. At Sandy Point, Mr. Grant tells me, Silurian crops out on the beach pretty extensively. Selwyn maps the country there as volcanic.

On the hills we saw red sandstones and clays forming some part of the older Tertiary series, and not till we crossed East Creek and began to ascend the hill did the road show any evidence of basaltic rock, and even then there were occasional patches of Tertiary sands overlying.

Along the sea cliffs we saw several examples of volcanic breccia as recorded by Selwyn, and also beds of reddish clay, which may represent decomposed tuffs, but without closer examination it is not possible to say whether they are so or merely decomposed solid rock. Judging by the breccia there should be an old vent at no great distance comparable to those near Clifton Springs and Airey's Inlet.

In several places along the coast the old line of cliffs is separated from the shore platform by a grass and tree covered belt which points to a recent elevation of at least 5 feet.

All the members of the party are not agreed as to this interpretation, but I see no other possible one—the storm-beach theory not, to my mind, being adequate.—T. S. HALL.

MINERALOGY.—The neighbourhood of Flinders, though of special interest to the biologist, does not fall far behind from the point of view of the geologist or mineralogist. From the latter standpoint the recent Easter camp-out of this Club at Shoreham may be said to have been highly successful, all the members so interested coming home with well-filled—and I might say, from personal experience, very heavy—bags of very beautiful zeolitic and other minerals.

One of the first localities to engage our attention was on the ocean beach just below Flinders, where some fine dykes through the basaltic and volcanic ash layers are to be seen at low tide. Near the shore end one of these dykes stands up slightly, a foot or two above the general floor level, but out towards low tide

mark it stands up as a great wall 6 or 8 feet in height, and averages something over 2 feet in thickness. Its course is generally in a south-westerly direction, but is distinctly sinuous. This dykestone, on examination, yielded many good examples of included minerals, amongst which may be noted Hornblende, Oligoclase, Biotite, and Apatite, and, of subsequently developed species, Calcite and Gmelinite may be mentioned, together with a very fair development of Limonite casing in parts. Another fairly large dyke in this neighbourhood runs nearly at right angles to that above mentioned—that is, approximately, in a south-easterly direction—and is about 3 feet in width. This dyke also contains similar occurrences of the above minerals, but much larger included fragments can be obtained from it. We next visited a section between 3 and 4 miles along the coast towards Cape Schanck, which is an old and favoured hunting ground for many of the zeolites. We were very fortunate in being able to work out some very fine examples of Natrolite, Analcite, and Gmelinite, also Calcite, Aragonite, Magnesite, and Dolomite.

There are distinct basaltic and ash layers at this locality, and both have been subjected to considerable decomposition, hence the particular vugh-bearing layers of basalt richest in zeolites are fairly easily worked by the enthusiastic mineralogist; but as some of the best ledges can only be reached from the shore at low tide the spot is one that might frequently be found to be disappointing, and at the same time due caution has to be exerted to avoid risk from some of the occasional gigantic breakers that thunder in on this rugged coast. From a scenic point of view there are many lovely aspects of this rough coast to be seen, as may be appreciated to some slight extent from the photographs submitted.

Geologically there are many points in the weathering of the rocks and the striking evidences of marine erosion that are of absorbing interest, but any detail of these features would perhaps be out of place in the present notes.

Although time did not permit us to go any further along the coast on this occasion, it might be noted that some good spots are sometimes accessible further along towards Cape Schanck. From one of these, about three miles on the Flinders side of the lighthouse, I have collected some very good examples of Chabazite, Calcite, Aragonite, and a variety of the latter mineral containing Strontium.

1. *Hornblende* occurs in small and large sized included fragments in a fine-grained dykestone, apparently basaltic, some of the fragments measuring up to $2\frac{1}{2}$ inches by 2 inches. It is of a black colour, and has a highly-perfect prismatic cleavage, which enables one to obtain very good oblique rhombic prisms of from an inch and less to 2 inches in length, and up to three-quarters of an inch along the macrodiagonal and about one-quarter of an inch along the brachydiagonal. This mineral can also be

obtained in some layers of the basalt at several parts of this coast in long, slender, acicular crystals up to a quarter of an inch in length and of a black colour.

2. *Oligoclase*.—Occurring similarly to the Hornblende in irregular fragments in the dykestones near Flinders. It is frequently in larger pieces than the Hornblende, the largest measured being $3\frac{1}{2}$ inches by 2 inches. It is occasionally clear and transparent, but more usually translucent dirty yellow, and much stained with oxide of iron; much of it is complicately twinned, and shows highly-perfect basal cleavage, also fair cleavage apparently parallel to the macropinacoid.

3. *Biotite* is another included mineral in the dykestones, ranging up to about 1 inch in diameter. It is of a black to brownish-black colour, with perfectly developed basal cleavage.

4. *Apatite* was also obtained in the dykestone as a good crystal of a dirty greenish colour, and over 1 inch in length, but comparatively slender, about one-sixteenth of an inch in diameter. The form was a hexagonal prism, and was terminated by a short hexagonal pyramid. The prism broke into several short lengths on extraction, apparently due to imperfect basal cleavage.

5. *Olivine* is very abundant in the basalt forming the shingle near West Head and along the coast to Cape Schanck. It occurs as very dark green glassy blebs, thickly strewn through the rock. As there are many stages in the decomposition of the basalt to be seen in this neighbourhood, many changes in the Olivine may also be noted until we meet with a soapy clay containing a mineral resplendent with a golden iridescence, probably a hydrated oxide of iron.

6. *Natrolite*.—This mineral is most abundant on the coast about 3 miles from Flinders, towards Cape Schanck, in a basalt which is rich in vughs. The mineral closely lines these vughs in acicular rosettes of crystals with a glassy lustre, but silky on fracture, and though in small bundles the crystals are well developed in numerous beautiful colours, amongst which are—pure white, fawn, yellow, pale and dark brown, pale pink, red, and red-brown.

7. *Analcite*.—Some fine examples of this mineral occur closely associated with the Natrolite, in clear transparent to milky translucent crystals of the cubic system, usually deltohedra, individual crystals ranging in size from very small microscopic forms up to about three-eighths of an inch in diameter. Contact and penetration twinning is frequently present.

8. *Gmelinite*.—Some extremely fine occurrences and crystallizations of this mineral were also obtained in association with the two foregoing. In colour it ranges through pale yellow, yellowish-red, orange, pink, and light to very dark shades of red. Crystals belonging to the hexagonal system, and occurring in simple

hexagonal pyramids, sometimes in ordinary penetration twins, and sometimes polysynthetically twinned; tabular forms were also procured, which on close examination proved to be complicately polysynthetically twinned on a minute scale.

9. *Chabazite*.—Typical forms of this mineral were obtained a few miles further along the coast in a very vesicular layer of basalt, nearly all the vesicles being nicely lined with Chabazite, Aragonite or Calcite. It occurs in rhombohedra, commonly twinned, and it varies from colourless and opaque white to pink.

10. *Calcite*.—This mineral is to be found in many forms all along this coast occasionally in the clear transparent form—Iceland Spar—more frequently in white or yellowish translucent forms, with the usual well-developed rhombohedral cleavage, also as stalactites, stalagmites, and mammillary concretions.

11. *Aragonite*.—So far as I am aware, some of the finest crystallizations in our colony are to be obtained in this neighbourhood, consisting of right rhombic prism combined with brachypinacoid and basal plane, about an inch to an inch and a half in length, and from one-eighth to one-fourth of an inch in diameter; stellate twins of the same form are also worthy of mention, and appear usually to consist of three or four individuals. There is no apparent cleavage, and the fracture is uneven.

12. *Aragonite*, var. ?—A fibro-crystalline and crystalline form of mineral containing carbonate of strontium in addition to carbonate of lime. Hitherto I have not been able to find any mineral description with which the present specimens quite agree, the nearest relative being apparently Mossottite. Further particulars on this mineral will be given later.

13. *Dolomite* occurs in rhombohedra with curved faces and a somewhat pearly lustre, also in compact complicately twinned masses.

14. *Limonite*.—Very good solid examples of this mineral can be obtained along this coast, but especially as a casing to the dykes already mentioned.

15. *Hematite*.—Small specimens are occasionally met with associated with the Limonite, and in the form of red ochre there is a fair impregnation in some of the decomposed ash layers.—G. B. PRITCHARD.

In conclusion I may say that the weather from the start on Good Friday was all that could be desired, while a better spot for the marine zoologist would be difficult to find. Full advantage was taken of these favourable circumstances, and no time was wasted, but a fortnight might easily have been spent in working among the reefs and along the shore in either direction from our camp. Earlier in the season, too, the surrounding timbered country would, I feel sure, prove a good collecting ground for the field zoologist and botanist, while some time might be devoted to working the creeks.

J. A. KERSHAW.



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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary meeting of the Club was held in the Royal Society's Hall on Monday evening, 12th May, 1902. The president, Mr. T. S. Hall, M.A., occupied the chair, and about 50 members and visitors were present.

CORRESPONDENCE.

From Mr. C. W. Maclean, Inspector of Fisheries, forwarding a report by Constable Carey, stationed at Whittlesea, regarding the wholesale destruction of birds of all kinds through eating poisoned grain laid for the destruction of rabbits, and asking the opinion of the Club as to whether the statement was correct with regard to the whole of the State.

The constable stated that he had seen hundreds of dead birds, and particularly quail, when passing along some of the country roads, and only recently counted no less than twenty-seven dead magpies on three miles of road. The constable's statement was verified by Messrs. G. A. Keartland, C. French, F.L.S., and C. C. Brittlebank, who stated that they had frequently found numbers of birds and opossums lying dead on the ground in districts where poison had been laid.

On the motion of Mr. F. G. A. Barnard, seconded by Mr. C. French, F.L.S., Messrs. J. A. Kershaw, G. A. Keartland, and C. C. Brittlebank were appointed a sub-committee to draft a reply on the matter.

REPORTS.

A brief report on the Club's excursion to Broadmeadows on Saturday, 19th April, was given by Mr. T. S. Hall, M.A., who acted as leader on the occasion. The party, consisting of twelve members, worked along the Broadmeadows Creek, and spent a pleasant and profitable afternoon in examining the geology of the district.

ELECTIONS.

On a ballot being taken, Mr. F. Chapman, F.R.M.S., National Museum, Melbourne; Mr. Clifford Coles, Elizabeth-street, Melbourne; and Mr. W. J. O'Neil, Lands Department, Melbourne, were duly elected as ordinary members; and Mr. J. C. Goudie, Birchip, and Mr. A. J. Smith, Port Albert, as country members of the Club.

GENERAL BUSINESS.

Nominations for office-bearers for 1902-3 were received, and Messrs. D. Best and S. W. Fulton were elected to audit the accounts for the past year.

Mr. J. Shephard gave notice of his intention to propose the following alteration to rule 6 at the annual meeting to be held in June next:—"That the words 'subscription shall have been paid, or while his subscription is in arrears' be omitted, and the words 'first subscription shall have been paid, or while any subscription subsequently due is more than six months in arrear.'"

Mr. G. A. Kearland reported that the deputation which, at the instance of the Club, waited on the Minister of Public Works to present the report of the sub-committee *re* the *Game Act*, was well received by the Minister, who promised to favourably consider the recommendations in respect to quail and ducks with a view to their adoption, and also to consider the advisability of altering the close season for opossums, and the proposed re-arrangement of the close seasons for other protected birds.

The President stated that the Club was indebted to Mr. Kearland, to whose efforts the successful carrying out of this matter was mainly due.

PAPERS.

1. By Mr. E. Anderson, entitled—"Notes on the Larvæ of *Gastrophora henricaria* and *Phallaria ophiursaria*."

The author described the larvæ of these two rare Victorian moths, which had been successfully reared from the eggs, and noted their food plant, &c.

Mr. C. French, F.L.S., remarked on the prevalence of a species of fungus which frequently destroys the larvæ of some of our moths, and was supported in his remarks by Messrs. F. Spry, D. M'Alpine, and the author.

Mr. J. A. Kershaw, F.E.S., stated that there was a necessity for further work of a similar character to that given by the author among our Victorian Lepidoptera, as, although the perfect insects were now fairly well known, there was a tendency to neglect the study of their life-histories, regarding which comparatively little had been published. He trusted the author would continue to give the Club the results of his researches in this direction.

2. By Mr. R. Hall, entitled "Notes on the Fish *Harpagifer bispinis*," Forster.

The author gave a few notes on a single specimen of this fish which he had collected in Royal Sound, Kerguelen Island, on one side of which, he stated, the lateral line was clearly visible throughout its whole length to the caudal, but on the other side was only visible on the anterior portion.

The paper was discussed by Messrs. J. A. Kershaw, F.E.S., and Professor Baldwin Spencer, M.A., F.R.S.

3. By Mr. F. S. Billingham, entitled "Effect of a Cloudburst."

The author described the damage caused by a cloudburst on a range of hills known as the Blue Range, near Alexandra, in December last. The sudden rush of water had washed away every vestige of vegetation from the hillside, while the beds of adjoining gullies had been torn out to a depth of from 4 to 6 feet.

NATURAL HISTORY NOTES.

Mr. R. Hall recorded the capture of a Tupong in the Werribee River on the 21st April, in the mouth of which were five young eels about 2 inches in length.

Mr. F. G. A. Barnard drew attention to a paragraph in *Knowledge* re animal matter, &c., in water mains, at Manchester, England.

Mr. J. Shephard stated that it consisted mostly of freshwater Polyzoa, and the occurrence was not uncommon in Victoria. It was known as "pipe moss."

EXHIBITS.

By Mr. E. Anderson.—Specimens of Moth, *Mnesampela comarcha*, Victoria.

By Mr. F. G. A. Barnard.—Fern, *Botrychium ternatum*, Swartz, with fertile frond, obtained on a Club excursion to Oakleigh some fifteen years ago, and since cultivated by exhibitor.

By Mr. A. Coles.—Two specimens of White Goshawk, *Astur novæ-hollandiæ*, showing the adult and young plumage.

By Mr. J. L. Dixon.—Native tomahawks and Quartzite chippings, evidently used by the aborigines.

By Mr. C. French, F.L.S.—Moth, *Charagia mirabilis*, Queens., male and female. Butterflies—*Ogyris ianthis*, New South Wales, male and female; *Hypochrysops olliffi*, *Hesperilla dirphia*, Victoria.

By Mr. C. French, jun.—Larva and perfect beetle of *Stigmodera heros*, the Oak Root-borer, from Wimmera, also large specimen of fossil shell, *Cypræa dorsatum*, Tate, collected at Grice's Creek, Mornington.

By Master C. French.—Eggs of Radjah Shieldrake (Burdekin Duck), from Northern Territory, first time exhibited in Victoria; also light-coloured egg of Pink-naped Bower-Bird, from Queensland.

By Mrs. H. W. Hunt.—Abnormal flowers of Rose.

After the usual conversazione the meeting terminated.

SOME NOTES ON THE DRAGON-FLIES OF THE ALEXANDRA DISTRICT.

By F. L. BILLINGHURST.

(Read before the Field Naturalists' Club of Victoria, 10th March, 1902.)

IN the "Memoirs of the Zoological Society of France," for 1901, vol. xix., p. 220, appears a paper by Mr. R. Martin, entitled "The Odonata of the Australian Continent," which gives a list of all known species authentically reported from one part or another of Australia proper, with descriptions of new species. The total number listed is 107, but it must, of course, be understood that, this group having been so little worked, the number is open to be largely augmented. This is shown by the fact that during the three summers I have been collecting for Mr. Martin in the Alexandra district, which is about 100 miles north-east of Melbourne, I have forwarded him 41 out of the 107 from the immediate district, 9 of which were quite new, and one other not previously described in print; and since I received the list I have sent him two more which do not appear in it, and which he has not yet identified. They are probably also new.

Having now something authentic to work from, I propose to give a list of my 41 species, with a few general remarks on their habits and appearance.

For the study of Odonata a well-watered country is necessary, the larvæ being aquatic, and in this respect I have been fortunate, Alexandra being situated in the valley of the Upper Goulburn, and surrounded by mountainous country. The Goulburn itself is a first-rate hunting ground; also the marshes and lagoons in its valley, and the creeks and smaller rivers which come down from the mountains are productive of many good things.

The Odonata are divided into three families, or seven sub-families, but as these were explained in some notes of mine published in the *Victorian Naturalist*, vol. xvii., p. 5 (May, 1900), there is no necessity to recapitulate, and I can proceed at once to enumerate the species found here under their respective families and sub-families:—

FAMILY I.—LIBELLULIDÆ.

Sub-family—Libellulinae.

Diplax melanopsis, Selys.

„ *nigrescens*, Martin, nov. sp.

„ *bipunctata*, Brauer.

„ *rubra*, Kirby.

Orthetrum caledonicum, Brauer.

The four species of *Diplax* are all comparatively small, red-bodied insects, the first three being marked with black; *D. rubra* entirely brilliant red. The females are yellow, marked with

black. They frequent lagoons and marshes, and I have very seldom seen them about running streams. They are not particularly strong of flight, and settle frequently on reeds, bushes, &c., and on the ground.

The male of *O. caledonicum* is a very pale blue, or heliotrope, much larger than *Diplax*. The body has a flattened appearance, tapering almost to a point. The female is brownish-yellow, with bronze markings. It is a swift-flying, restless insect, but frequently settles on the ground. I have seen it on ponds, creeks, and the Goulburn, but never far from water.

Sub-family—Cordulinae.

Cordulephya pygmæa, Selys.

Hemicordulia novæ-hollandiæ, Selys.

„ *australiæ*, Rambur.

„ *tau*, Selys.

Synthemis eustalacta, Burm.

„ *guttata*, Selys.

„ *brevistyla*, Selys.

„ *virgula*, Selys.

C. pygmæa is a pretty little insect, very rare. I have only seen it in one spot, a small lagoon, where it appears in small numbers every March, and seems to spend most of its time settled on tree trunks, logs, or posts, with its wings folded down the back, which is opposed to the habits of the two following genera, which settle with their wings spread out. It is bronze-black, with thin yellow rings. No difference of colouration between sexes.

The *Hemicordulia* are swift-flying insects of fair size, and have no special resort. They are frequently met with in the bush, far from any water. The three species mentioned are very similar in appearance, brownish-yellow with bronze markings. *H. tau* has a black T on the face, hence its name. *H. australiæ* has two brilliant metallic points and no T; the male has a tooth on the upper anal appendages, which is wanting in *H. novæ-hollandiæ*, as are also the T and the metallic points. No difference of colouration between sexes.

The *Synthemis* are similar in habits and size to the last genus, but are all black insects marked with yellow spots. They resemble each other a good deal, and are somewhat difficult to differentiate. The sexes differ somewhat in markings but not in colouration.

FAMILY II.—ÆSCHNIDÆ.

Sub-family—Gomphinae.

Austrogomphus guérini, Rambur.

„ *gouldi*, Selys.

„ *ochraceus*, Selys.

Medium-sized black and yellow insects, smaller than *Synthemis*. No difference of colouration in sexes, and very little in the markings. Frequent rivers, creeks, and marshes. Seldom seen far from water. There are twelve species of *Austrogomphus* recorded in Mr. Martin's list. I have only seen the three noted above.

Sub-family—*Æschninæ*.

Hemianax papuensis, Burm.

Æschna brevistyla, Rambur.

Planæschna tripunctata, Martin, nov. sp.

„ *sagitta*, Martin, nov. sp.

„ *longissima*, Martin, nov. sp.

„ *multipunctata*, Martin, nov. sp.

Austroæschna parvistigma, Selys.

„ *inermis*, Martin, nov. sp.

Telephlebia godefroyi, Selys.

The *Æschninæ* are all large, swift-flying insects, frequenting rivers, creeks, lagoons—in fact, water of any kind—and, like *Hemicordulia*, are often seen in the bush at a distance from any water at all. On account of their rapid flight they are difficult to capture, requiring a large net and a quick eye and hand. This is probably one reason of so many of my species being new. They are always on the move during the day, but towards evening begin to settle on trees, bushes, &c., generally pretty high out of reach. Some of the species enumerated I have never seen in the valleys and lower grounds, but only on the mountain streams at some altitude. *P. longissima* and *T. godefroyi* are examples.

H. papuensis is brownish-yellow with black markings. The *Æschnæ* are all black or chestnut-brown, with yellow or greenish spots and patches. *T. godefroyi* is a very striking insect, of a pale brown colour and easily recognizable by the fact that the wings have a dark brown stripe extending from the base along the costa to the tip, with a brown patch surrounding the nodus. It has a penchant for settling on rocks and stones, and is very rarely met with.

The sexes in the *Æschninæ* do not differ in colour, but more or less in markings.

FAMILY III.—*AGRIONIDÆ*.

Sub-family—*Calopteryginæ*.

Diphlebia lestoides.

This is the sole recorded Australian representative of the sub-family. It is a very variable insect, both in size and colour. The adult males are blue or pale green with bronze-black markings. The young males are the same colour as the females—brownish-

yellow with black markings. Frequent rivers, creeks, and lagoons, and are fond of settling on the ground.

Sub-family Agrioninæ.

Lestes leda, Selys.

„ *annulosa*, Selys.

„ *analis*, Rambur.

Argiolestes icteromelas, Selys.

„ *grisea*, Selys.

Synlestes weyersii, Selys.

Nososticta solida, Selys.

Isosticta simplex, Martin, nov. sp.

Ischnura heterosticta, Burm.

„ *delicata*, Selys.

Pseudagrion cyane, Selys.

„ *billinghursti*, Martin, nov. sp.

Xanthagrion erythroneurum, Selys.

Agriocnemis splendida, Martin, nov. sp.

Hemiphlebia mirabilis, Selys.

The Agrioninæ are slender-bodied insects, mostly weak of flight, and the majority frequent only ponds, lagoons, and marshes, *A. icteromelas* and *S. weyersii* being exceptions. Some of the species are very small, the rest medium, except *P. billinghursti* and *S. weyersii*, which are fairly large. They are of a variety of colours, but all have a more or less metallic tinge. In nine out of the fifteen species named the sexes are alike in colour. In the remaining six they are very different, and it is a fact worthy of note that in all these six the males are blue or have blue somewhere on their bodies; none of the others have; and this is also to be noticed in *Orthetrum caledonicum* and *Diphlebia lestoides*. The only other cases in my list where the sexes differ materially in colour are the red Dipteres. Owing, I presume, to the weakness of their flight, most of the Agrioninæ appear to be gregarious, and when one of a species is seen there are generally several more near. This is especially the case with *L. analis*, which is our commonest Dragon-fly, frequents reeds and rushes, and can be taken in scores in a patch a few yards square. It is bronze and pink in color. *S. weyersii*, *A. splendida*, and *H. mirabilis* are brilliant metallic green. The latter, a very small species, was only recorded from Queensland before I took it. It is very local and rare here. *N. solida* is a beautiful little insect, dark bronze with brilliant orange thorax and the wings tinged with saffron. The males of *I. heterosticta* and *P. cyane* are very similar at first sight—bronze with anal segments brilliant blue—but the latter is only about half the size of the former. The females are very different from each other. The male *I. delicata* is red with blue anal segments;

female, dull metallic green. It is the smallest of the flies listed. *P. billinghursti* is a striking insect, brilliant blue marked with bronze ; female yellowish, with same markings. *A. icteromelas* is a very common insect, dark bronze, almost blackish, in colour. *A. grisea* is smaller. *X. erythroneurum* has a red thorax.

NOTES ON THE ARGONAUTS.

By JAS. A. KERSHAW, F.E.S., Curator of Zoology, National Museum.

(Read before the Field Naturalists' Club of Victoria, 10th March, 1902.)

THE great interest which has been aroused in the Argonauts, owing to the large numbers which have recently appeared in Port Phillip, and the tendency to confuse this form with the shell commonly known as the Pearly Nautilus, *Nautilus pompilius*, has induced me to put these few notes together, in the hope that they may prove of interest to such of the members who are unacquainted with the history of this animal. Though I do not claim to add anything of importance to what has already been published from time to time, I trust they may tend to stimulate further research among our members with a view of learning more of the life-history, and filling up some of the gaps in our knowledge of these interesting creatures.

For some time past, and particularly during December and January last, large numbers of these shells have been washed ashore in various parts of the Bay, which, on account of their beauty and novelty, have created a good deal of excitement among seaside visitors and others, many of whom have searched the shores early and late—even after dark with the aid of a lantern—in the hope of picking up some of these greatly prized shells. Some of the more fortunate searchers have succeeded in gathering in a short time as many as twenty-five and thirty specimens each, either on the sand or by wading in the shallow water, and it was no uncommon sight, as daylight was breaking, to see a number of figures wading about in the water and watching for the shells to float in with the tide. Small parties of fishermen, with the assistance of their boats and a shrimp net, have been known to have collected as many as seventy or eighty shells each, and these they have disposed of to seaside visitors and others at from 5s. to 15s. and even £1 per pair, according to their size. The broad sandy beaches of Mordialloc and Carrum have probably yielded the largest number, while they have also been found more or less commonly all along the shores on both sides of the Bay. During the early part of February two specimens were captured just outside the Heads, at Point Lonsdale, while slowly drifting in towards the shore, and others were reported from various places both east and west of the Heads.

Two species of Argonauts have been recorded from Victorian waters—namely, *Argonauta nodosa*, Sol. (long known to collectors as *A. tuberculata*), and *A. argo*, Linné. The former is the species which so frequently visits the Bay, and occasionally appears in large numbers, though the quantities found recently probably greatly exceed those of any previous year. It has a wide distribution, being recorded from Chili, Brazil, Cape of Good Hope, Indian Ocean, Moluccas, New Zealand, Tasmania, and Australia. Of Australian specimens the National Museum, Melbourne, possesses examples varying in size from very young to the largest, from Western and South Australia, Tasmania, Clark Island, Phillip Island, and various parts of Port Phillip Bay ; several of these shells contain the animal, and in one or two instances the ova.

Argonauta argo has been recorded from the Lakes' Entrance, Gippsland, but it is rarely found in Victorian waters, though why this should be so is difficult to understand, seeing that it is met with on the coasts of Western and South Australia, New South Wales, and Queensland as far north as Torres Straits.

This species has also a very extensive range outside Australia, being found plentifully at certain times of the year in the Mediterranean, and has also been recorded from the tropical parts of the Indian, Pacific, and Atlantic Oceans, and the Cape of Good Hope.

The Argonauts belong to the order Dibranchiata, which embraces those forms which are furnished with only two gills, and to the sub-order Octopoda, having only eight arms. These arms are all furnished with suckers similar to the common Cuttle-fish. It is the female only which constructs a shell, which is readily recognized by its thin, wrinkled, single-chambered structure, and is really nothing more than an egg-cradle for the protection of the ova, though at the same time it affords protection to the animal itself, and perhaps also for the newly-hatched young. In no sense is it equivalent to the ordinary Molluscan shell. It is not organically connected to the shell in any way, as is the case with the Pearly Nautilus, merely retaining its position in the shell by means of its two broadly-webbed dorsal arms, which are furnished with suckers from the base completely round the extreme margin of the web.

These clasp and cover the whole shell, just as the shells of the Cypræa are covered by the mantle of the animal. By the webbed extremities of these two dorsal arms the shell of the Argonaut is secreted, and from the observations made on *A. argo* by Madame Power, published in 1838 and commented on very fully by Professor Owen, it is shown that the animal quickly repairs any damage sustained by the shell. According to the same authority the young Argonauts are excluded from the eggs naked about

twenty-five days after oviposition, and in ten or twelve days more they were discovered to have formed their little shells. Exactly when they begin to form their shells is yet unknown.

The body of the smaller Cephalopods occupies the whole of the cavity of the shell, to which it closely corresponds in form, and, as stated by Professor Owen, evidently "serves as a mould upon which the shelly matter has been deposited," the shell being gradually enlarged as the animal grows. With the larger animals the body is drawn from the apex of the shell when the ovary begins to enlarge, and the unoccupied space forms a chamber in which the ova are deposited. The ova consist of a large bright red mass, and are attached together by a network of filaments, and fill the spire of the shell.

The Argonaut sits in its shell with the funnel turned towards the keel, and swims, like other Cephalopods, by forcibly emitting jets of water, which has served the purpose of respiration, through its funnel, the reaction driving the animal in the opposite direction. Like the Cuttle-fish also, it is furnished with an ink-bag, from which it secretes through the funnel an inky fluid, which serves to facilitate its escape from danger. This is frequently experienced by anyone who has captured an Argonaut while gently swimming in the water, the least alarm causing it to eject its inky fluid, which discolours the surrounding water, while the animal suddenly sinks with its shell and swims rapidly away. The ink is said to have been used by the Chinese in the preparation of sepia, and in Turkey and Italy the preparation of sepia from the dried pigment of the ink-bags of the Cephalopods is still practised.

The oft-repeated statement that the Argonaut takes advantage of fine weather to come to the surface, and spreading its broad dorsal arms so as to act as sails, allows itself to be propelled along by the breeze, is now discredited by all modern naturalists. It was also contended by some of the earlier leading Malachologists that the animal inhabiting the Argonaut shell was a parasite, which, by either expelling or succeeding the original owner, obtained possession. This led to a long controversy among many of the leading authorities on the subject, including Owen, Rang, de Blainville, Gray, and others, the result of which, greatly assisted by the results of the observations made by Madame Power, has been to establish the fact beyond all doubt that the female Argonaut constructs her own shell by means of the webbed dorsal arms.

The male Argonaut, which is very rarely met with, differs greatly from the female, being always considerably smaller; the body, not exceeding an inch in length, is not provided with a shell, nor is the dorsal pair of arms developed as in the female. One of the arms, the third on the left side, is, however, modified

in a curious manner, being at first enveloped in a kind of cyst, which later on bursts and allows the arm to expand to its full extent, when it greatly exceeds in length the other arms. It is furnished with suckers for part of its length, the remainder consisting of a long thread-like organ. This is known as the hectocotylus arm. The male has the power of detaching this arm, which it leaves within the mantle-chamber of the female, and which retains the power of independent movement for some considerable time. It was owing to one of these being discovered within the mantle of the female which led to its being described by Cuvier as a parasite, under the name of *Hectocotylus octopodis*.

The Argonaut is readily distinguished from the Nautilus, owing to the latter being permanently attached to its shell, the arms being numerous, short and pointed, and devoid of suckers, and the absence of an ink-bag. The shell is divided into a number of chambers by regularly curved divisions or septa. These septa are perforated in the centre to allow of the passage of a long, narrow tube known as the siphuncle, the use of which is unknown, which traverses the whole length of the shell to the apex, and is connected with the animal, which occupies the outer chamber. The Pearly Nautilus belongs to the order Tetrabranchiata, and is the only living Cephalopod which is provided with four gills. It is the sole survivor of the order, and includes among its fossil relatives the beautiful and well-known Ammonites. The genus embraces four living species, three of which have been recorded from the New South Wales and Queensland coasts, but none have been known so far to occur in Victorian waters. Shells of all these species are represented in the National Museum collection, two of which contain the animal.

There are many points in the history of this animal which still require clearing up. Although shells containing the animal and ova are very frequently collected, none, so far as I can learn, have been found occupied by the newly-hatched young. This would lead us to conclude that the young, which, like other Cephalopods, grow very rapidly, desert the shell of the parent immediately after hatching, and start out for themselves.

One of the questions which suggest themselves is, that as the shell is regarded more as an egg-cradle than as a permanent abode for the protection of the animal, does she either before or shortly after the hatching of the ova purposely desert her shell; and if such be the case, does she then die? Sir F. M'Coy, in the "Prodromus of Zoology of Victoria," vol. i., plate 61, after describing the rapid variation of the colours of the animal, continues:—"This colouring of the surface of the body, like naked Cuttlefishes, is another reason for believing that the shell is not a per-

manent habitation, but a temporary egg-case." Professor Owen, however, states that the fresh shell, being permeable to light, it was obvious that light would act in developing the coloured spots on the body of the Argonaut.

It is quite true that the animal can, and sometimes does, when greatly frightened, leave its shell, but does it re-enter it again? Sir F. McCoy states, regarding a specimen which he kept alive for some time. "that when greatly frightened it abandoned its shell and darted away with great velocity, but *got back into it again* when left alone." According to Madame Power, "the constant result of depriving the Argonaut of its shell is a gradual loss of vital power and ultimate death within a few hours at furthest." Again, Mr. A. Adams, in giving the results of his observations on a number of specimens which he captured during the voyage of the *Samarang*, and kept in captivity, says that, although the Argonaut can readily disengage herself from the shell, "she has not the power—or, more properly, the sagacity—to re-enter her nest, but, after darting and wounding herself against the sides of the vessel, soon becomes languid, and very shortly dies."

These results, being from observations made on the animals in captivity, where, being confined in a limited space and under frequent observation, they would naturally be in a continual state of alarm, may not apply to the animal in its natural environment. As shown above, the death of the animals was really the result of injuries received in their endeavour to escape from confinement, and no doubt accelerated by fright; therefore, if the animal in the free state were by any means deprived of its shell, it may still survive its loss. The probability is that, under natural and healthy conditions, the animal never leaves her shell, but carries it about with her continually as a receptacle for her eggs. The opportunity is now afforded any of our members who may be inclined to take the matter up to endeavour to complete our knowledge of the habits of these Argonauts.

EFFECT OF A CLOUDBURST.

BY F. L. BILLINGHURST.

(Read before the Field Naturalists' Club of Victoria, 12th May, 1902.)

ON the 31st December, 1901, the Little River, which joins the Acheron at Taggerty, was observed to rise about a foot, and the garden of a settler living near it was flooded. For two or three weeks afterwards the water was so muddy as to be unfit for drinking, though it is usually one of the clearest of mountain streams. Such an occurrence naturally created some curiosity, and a search was made for its cause, which appears to have been the bursting of a cloud on a range of hills known as the Blue Range, which runs parallel with the Alexandra-Taggerty road

the altitude of the ridge being, I should judge, somewhere about 3,000 feet. I have recently paid a visit to the scene of the affair, and was much struck by the devastation which has been created in what was previously a very ordinary little fern gully, and possibly a short description of it may interest some of the members of the Field Naturalists' Club.

The flow of water commenced high up the range, but not quite at the top, and came down two narrow gullies which run nearly parallel with each other and eventually join. The hill here is very steep, and the force of the water must have been something tremendous, as not only is every vestige of vegetation washed away, but towards the junction the bed of each gully has been torn out to a depth of 4 to 6 feet, while up on the banks are barricades of huge tree trunks, roots, and tree ferns. After the junction the descent is more gradual, and the gully is wider. As before, all vegetation has been washed out, and the gully has been filled with granite rubble from the size of a cricket ball upwards. This rubble varies in width from 20 to 50 feet, and continues for perhaps a mile and a half, the same barricades of tree trunks, &c., being met with here and there. It ends quite abruptly at a point from which the descent becomes very gradual, and here the water evidently spread out, as the first signs of silt and sand are met with, but the bulk of this must have been carried right down into the Little River, which will account for the muddied appearance of that stream afterwards.

What strikes the spectator more than anything is the way big lumps of granite have been rolled about like so many marbles and tree trunks washed about like saplings. Another curious feature is that the gullies on either side, at comparatively short distances, have not been touched. Both the force and the volume of the water must have been enormous, and though I understand such occurrences are not unknown in this State, I doubt whether many have left such traces of wreckage behind them. Probably the whole thing was over in a quarter of an hour, but just now that gully looks as if a company had been hydraulic sluicing there for years.

WEST AUSTRALIAN BIRDS.—An extensive paper, containing notes on some seventy species of West Australian birds, from the pen of Mr. Robert Hall, appears in the *Ibis* for January and April, 1902. He also contributed to the *Emu*, April, 1902, a paper on "Some Bird-Skins from the Fitzroy River, North-West Australia."

FERNS.—In continuation of his "Studies in the British Flora," Mr. R. L. Praeger writes in *Knowledge* for May, 1902, on "Ferns," and gives a well-illustrated article on the life-history of this favourite group of plants, many of his remarks being applicable to our Victorian species.

DESCRIPTIONS OF SOME AUSTRALIAN BIRDS' EGGS.

By ALFRED J. NORTH, C.M.Z.S., Ornithologist, Australian Museum, Sydney.

AMONG a number of nests, eggs, and bird skins lately received by the Trustees of the Australian Museum, Mr. G. A. Keartland and Mr. Chas. French, jun., of Melbourne, from the neighbourhood of the Daly River, in the Northern Territory of South Australia, are the eggs of the following species:—

CHLAMYDODERA NUCHALIS, Great Bower-bird.

A beautiful egg of this species in Mr. French's collection is a pronounced elongate-oval in form, and exceeds in length any Bower-bird's egg I have measured. It is of the usual pale greenish-grey ground colour, and umber-brown scrolls, lines, blurred streaks, and labyrinthine surface markings, but is remarkable for having one near the smaller end bearing a striking resemblance to a man's face. Length, 1.83 x 1.13 inches. This egg, taken in January, 1902, was the only one in the nest; apparently it was in an advanced state of incubation.

PITTA IRIS, Rainbow Pitta.

The eggs of this species are typically rounded oval in form, the shell being close-grained, smooth, and slightly lustrous. They are white, with small freckles, rounded spots, and a few larger irregular-shaped blotches of inky or blackish-grey scattered over the surface of the shell, intermingled with less numerous underlying markings of a lighter shade. In most specimens the larger blotches are darker and unevenly distributed; in one the markings are all small and are confined to the thicker end, but in none do they assume the form of a zone. A set of four, taken on the 1st February, 1902, measures as follows:—Length—(a), 1.02 x .84 inches; (b), 1.02 x .83 inches; (c), 1.04 x .84 inches; (d), 1.1 x .84 inches. Another set of four taken on the following day, measures—(a), 1.02 x .85 inches; (b), 1.06 x .83 inches; (c), 1 x .83 inches; (d), 1.03 x .85 inches. This bird builds on the ground in clumps of bamboos, but the nest was too frail to bear removal. A skin of a young bird was sent with these eggs for identification.

ORTYGOMETRA CINEREA (*Porzana leucophrys*, Gould), White-eyed Water Cuckoo.

Judging by the number of sets of eggs of this species I have examined, it is apparently a very common bird in the Northern Territory. The eggs, which vary from four to six in number for a setting, are oval or rounded oval in form, the shell being close-grained, smooth, and slightly lustrous. The ground colour varies from a dull greenish-white to a light yellowish-clay shade, which

is almost obscured by innumerable fleecy markings, varying from yellowish-brown to dull chestnut-brown. As a rule the markings are fairly even in size and distributed over the entire surface; in others they are intermingled with a few large confluent patches, while in some they are larger and predominate chiefly on the thicker end. A set of four taken on the 20th February, 1902, measures as follows:—Length—(a), 1.11 x .9 inches; (b), 1.1 x .87 inches; (c), 1.11 x .87 inches; (d), 1.07 x .83 inches. A skin of the parent bird was sent with these eggs. A set of six eggs in Mr. French's collection, taken on the 21st January, 1902, measures—(a), 1.13 x .87 inches; (b), 1.13 x .85 inches; (c), 1.17 x .85 inches; (d), 1.16 x .86 inches; (e), 1.13 x .85 inches; (f), 1.13 x .85 inches.

NETTOPUS PULCHELLUS, Pygmy Goose.

A nest of this beautiful species found in the grass on the margin of a swamp on the 10th February, 1902, contained five fresh eggs. They are blunt ellipses in form and faint creamy-white in colour, the shell being very smooth, lustrous, and more or less nest-stained, two of the specimens so much so that they are of a uniform light yellowish-brown. Length—(a), 1.69 x 1.35 inches; (b), 1.82 x 1.37 inches; (c), 1.75 x 1.36 inches; (d), 1.7 x 1.36 inches; 1.73 x 1.35 inches; (e), 1.7 x 1.35 inches. A skin of the parent was sent with these eggs. A set of eight in Mr. G. A. Kearland's collection, taken on the 7th February, 1902, measures—(a), 1.75 x 1.37 inches; (b), 1.77 x 1.42 inches; (c), 1.77 x 1.4 inches; (d), 1.72 x 1.38 inches; (e), 1.83 x 1.4 inches; (f), 1.7 x 1.34 inches; (g), 1.76 x 1.38 inches; (h), 1.7 x 1.35 inches.

DENDROCYGNA ARCUATA, Whistling Tree-Duck.

A skin of this bird was sent, together with five eggs taken from a nest in the grass on the 5th February, 1902. They are oval in form, faint creamy-white in colour, the shell being smooth, lustrous, and more or less nest-stained, and measure as follows:—Length—(a), 2.02 x 1.51 inches; (b), 2 x 1.5 inches; (c), 2.04 x 1.51 inches; (d), 2.07 x 1.53 inches; (e), 2.06 x 1.54 inches.

DENDROCYGNA EYTONI, Eyton's Tree-Duck

A set of ten eggs in Mr. G. A. Kearland's collection, taken on 7th March, 1902, vary from oval to rounded oval in form, the shell being close-grained, smooth, and slightly lustrous. In a few places where the original colour is revealed they are of a milk-white, but are much nest-stained, some being of a uniform, others of a partial pale brown hue. They measure:—Length (a), 1.97 x 1.45 inches; (b), 1.92 x 1.48 inches; (c), 1.83 x 1.45 inches; (d), 1.98 x 1.47 inches; (e), 1.95 x 1.45 inches; (f), 1.83 x 1.4 inches; (g), 1.95 x 1.5 inches; (h), 1.94 x 1.49 inches; (i), 1.84 x 1.49 inches; (j), 1.9 x 1.52 inches.

TADORNA RADJAH, White-headed Sheldrake.

An egg in Mr. Keartland's collection, taken on the 6th April, 1902, is a nearly true ellipse in form, the shell being close-grained, very smooth, and lustrous. It is of a uniform pale cream or creamy-white. Length, 2.48×1.68 inches. Two similar eggs in Mr. French's collection, from the same set, measure—(a), 2.35×1.7 inches; (b), 2.3×1.71 inches.

SOME SOUTH AFRICAN BIRDS' EGGS.—Some particulars respecting the eggs exhibited this evening may be interesting. The large eggs in the case are those of a bird commonly known in the Transvaal as the Sooty Frog-wader. They were taken on 24th August, 1901. The nest was built in an old giant willow, about 40 ft. from the ground; from a little distance it looked very similar to that of our Wedge-tailed Eagle. On reaching the nest I found it to be a covered-in one, the entrance being on the side facing the east; it was composed of sticks, bamboos, &c. (to say nothing of two old socks), and smelt very unpleasant. On removing the roof I exposed a cavity of about a foot high and two wide; it contained three ugly, recently-hatched, violet-hued young and two addled eggs. The young strongly protested against being handled, and made their objections manifest by much squeaking and pecking. The parent birds did not put in an appearance, although it was evident that they had witnessed the transgression, for many shrill notes issued from a neighbouring clump of bushes. There were two more nests in adjacent trees; they had, to all appearance, been used for several successive seasons. The greenish-blue eggs are those of a bird commonly known as the Red Bishop-bird, *Pyromelana oryx*. They were taken at Wilmansrust in the Transvaal, the scene of the Victorians' disaster; the nests were built in some wattle trees, close by the graves of the fallen. This handsome little scarlet and velvety-black bird is seldom found far from marshy ground. It usually nests in colonies. The nests are domed, and are woven out of grass, and are, as a rule, four or five feet above the ground or water; the freshly-made nests are a bright green, but soon dry to a yellow colour. The colony mentioned was of considerable extent; roughly estimating, I should say there were some 60 nests in about 40 square yards. The nests contained from 3 to 11 eggs. The eggs vary a good deal, even in the same nest. I found many freshly laid eggs on the ground. Most of the other eggs in the case belong to different species of Weavers; they generally build their nests in bushes overhanging a spruit (stream). —H. ERNEST GATLIFF. Carlton, 10th March, 1902.

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE twenty-second annual meeting of the Club was held at the Royal Society's Hall on Monday evening, 16th June, 1902. The president, Mr. T. S. Hall, M.A., occupied the chair, and about 60 members and visitors were present.

REPORTS.

A report of the Club's visit to the Zoological Gardens on Saturday, 17th May, was read by Mr. D. Le Souëf, C.M.Z.S., who stated that some 20 members attended, and, under his guidance, spent a pleasant afternoon viewing the various animals contained therein. Several improvements were noticed, particularly in the aviaries, which are now constructed of wire-netting only, some large shrubs providing all the shelter necessary. The birds certainly looked at home here, and were in perfect condition. A number of the smaller kinds of native birds were noticed, such as Quail, Collared Plain Wanderers, Warty-faced and Lunulated Honey-eaters, &c., while the nesting mounds of the Scrub Turkeys again attracted much interest. Among the larger mammals is a fine Indian Tapir, which has been added to the collection since the Club's last visit, while the Polar Bears now seem to be thoroughly acclimatised and are in perfect condition.

A report of the excursion to Mitcham on Saturday, 14th June, was read by Mr. F. G. A. Barnard. Messrs. C. French, jun., and A. H. Westley acted as leaders, in the unavoidable absence of Mr. G. Coghill. After following the Doncaster road for about half a mile some paddocks which sloped towards the Mullum Mullum or Deep Creek were visited. Here the Native Heath, *Epacris impressa*, principally the white variety, was fairly plentiful, but, being almost midwinter, other flowers were necessarily scarce. However, stray specimens of *Viola betonicifolia*, *Erythraea australis*, *Daviesia corymbosa*, and *Acacia verticillata* were found in bloom. The best flower of the day was *Hibbertia obtusifolia*, which, with its handsome yellow flowers, about an inch across, brightened the hillside near Mr. Westley's house. Fungi were fairly plentiful, but none of particular interest were seen. The most surprising find of the afternoon, however, was a spray of *Bursaria spinosa* in bloom, which was thus either six months too late or six months too early. Such a divergence from the normal flowering season seemed worth recording.

The hon. librarian acknowledged the receipt of the following donations to the library:—*Entomologists' Monthly Magazine*,

several parts, from Mr. S. W. Fulton ; "Report on the Pitfield Plains Goldfield, Victoria," from the Department of Mines ; *Journal of Agriculture of Victoria*, vol. i., part 5, from Department of Agriculture ; "Catalogue of Nests and Eggs of Australian Birds," part 2, and "Records of Australian Museum," May, 1902, from the Australian Museum, Sydney ; "Queensland Flora," part 5, by J. F. Bailey, F.L.S., Colonial Botanist, from Department of Agriculture, Brisbane ; "Proceedings of Royal Society of Queensland," vol. xviii., part 1, from the society ; "Proceedings of Linnean Society of New South Wales," vol. xxvi., part 4, from the society ; "Report on Forestry of Tasmania," from Royal Society of Tasmania ; "Annual Report of Smithsonian Institution, 1900," from the institute ; *Nature Notes*, April and May, 1902, from the Selborne Society, London ; *Science Gossip*, April, 1902, and *Knowledge*, April and May, 1902, from the proprietors.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. H. Darrell Hawkins, Rowan-street, Elsternwick, and Master Roy Felstead, 39 Brighton-road, St. Kilda, were elected as ordinary members ; Mr. Ed. Henry Hatfield, Pakenham, and Mr. D. Goudie, Birchip, as country members ; and Master C. French, Richmond, as a junior member.

ALTERATION TO RULE.

Mr. J. Shephard, being unable to attend to move his proposed alteration to rule 6 of the Club rules, wrote asking that the matter be postponed to the following meeting. Mr. F. G. A. Barnard therefore moved—"That the next ordinary meeting be a special meeting for the purpose of considering the proposed alteration of rule 6," which was seconded by Mr. D. Le Souëf, C.M.Z.S., and, after a short discussion, was carried.

ANNUAL REPORT.

The hon. secretary, Mr. J. A. Kershaw, F.E.S., then read the twenty-second annual report for 1901-2, which was as follows :—

"To the Members of the Field Naturalists' Club of Victoria. Ladies and Gentlemen,—In presenting to you the twenty-second annual report, embracing the work of the Club during the past year, ending 30th April, 1902, your committee have much pleasure in congratulating you on the continued steady progress being made.

"The membership is steadily increasing, and now totals 164, comprising 145 ordinary, 2 life, 9 honorary, and 8 country members, while recent nominations point to a still further increase in the year upon which we have just entered.

"Our roll of honorary members has sustained a loss in the death of Professor Ralph Tate, F.G.S., who for 25 years occupied

the chair of natural science at Adelaide, and whose good work in Australian palæontology, conchology, and botany was appreciated throughout the scientific world.

"The attendances at the monthly meetings have been most satisfactory, a feature which is especially encouraging to authors of papers, who thus feel that their work is appreciated by their fellow-members. The papers read have in many instances excited considerable discussion, which has lent additional interest to our meetings, while several have been well illustrated by lantern views.

"Of the papers read 18 were on zoological subjects, 2 botanical, 2 geological, 2 general, and 3 were accounts of trips, totalling altogether 27. Of the zoological papers 8 were devoted to birds, 8 to insects, 1 to fish, and 1 to molluscs.

"The authors were Messrs. F. L. Billingham, F. P. Dodd, W. V. Fitzgerald, J. F. Haase, T. S. Hall, M.A., R. Hall, G. A. Keartland, J. A. Kershaw, F.E.S., D. Le Souëf, C.M.Z.S., S. A. Le Souëf and H. Bullen, J. Lidgett, J. H. Maiden, F.L.S., A. W. Milligan, G. B. Pritchard, O. A. Sayce, H. T. Tisdall, and C. Wallis.

"In addition to these, Messrs. R. Hall, A. J. North, C.M.Z.S., and D. Le Souëf, C.M.Z.S., contributed articles of a technical nature, which were printed without being read.

"Natural history notes have been read at nearly every meeting, while the exhibition of specimens still continues to prove one of the most valuable features of our meetings. Still more, however, might with advantage be done in this direction, the keen interest shown by members being sufficiently encouraging for a further extension of this part of our monthly programme.

"Another volume, the 18th, of the *Victorian Naturalist* has been completed under the able editorship of Mr. F. G. A. Barnard, to whom we are again indebted for his conscientious work and the unfailing regularity with which our journal is issued. To Mr. E. H. Swan, of the Triumph Engraving Company, our thanks are again due for gratuitously providing process blocks when required for illustrating our journal.

"The holding of camping-out excursions has proved a valuable addition to our annual excursion list, and is now thoroughly established as a most important part of our field work. Two of these 'camps' have been held during the year—one in November, at Gembrook, in which some of our lady members took part, and the other in March, at Shoreham, on Western Port Bay. Both were well attended, and the results obtained most satisfactory. These prolonged excursions are specially valuable in that they afford the opportunity of working the selected areas much more thoroughly than can be done by short visits, besides stimulating individual interest through working in the company of others of

similar tastes. The usual short excursions have been in many instances well attended, but it is to be regretted that more of the members do not avail themselves of these excellent opportunities for increasing their knowledge in their respective branches of natural history.

"The usual exhibition of wild flowers was held at the October meeting, which was on this occasion set apart for this purpose, and, though the exhibitors were not so numerous as they might have been, a good collection of native flowers was shown and duly appreciated by the large attendance of members and visitors.

"During the year the Club attained its majority, and as such an occurrence is worthy of special recognition it was decided to celebrate it by a musical reunion, in which a number of friends assisted. Among those present were nine of the original members of the Club, and a most enjoyable evening was spent, during which Messrs. C. French, F.L.S., and D. Best related some amusing experiences of the early days of the Club. This opportunity was taken to present Mr. G. Coghill, the retiring hon. secretary, with a bound set of "Chambers's Encyclopædia," which had been subscribed for by his fellow-members, in recognition of the valuable services he had rendered while acting as hon. sec. during the previous four years. As a memento of this interesting stage of the Club's career, Mr. F. G. A. Barnard presented to the Club a framed record he had prepared, showing the office-bearers during the 21 years, together with a list of the original members, which is now hung in the Club room.

"In order to coincide with the wild flower season, and thus introduce a new feature, it has been decided to hold a two days' conversazione during September next, when it is hoped that every effort will be made by members to make it the success it deserves to be.

"It was also deemed advisable by your committee to reprint the Club rules, and, as several alterations had been made since last printed, the whole were carefully revised and adopted at a special meeting convened for the purpose, and will shortly be ready for distribution.

"In order to enable members, and more especially those who have only recently joined, to more readily distinguish fellow-members while attending field excursions, meetings, &c., the adoption of a distinguishing badge was suggested, and after long and careful consideration of the several suggestions received, it was decided to recommend that the shell *Nassa fasciata*, which, mounted as a pendant, could be either worn on the coat or attached to the watch chain, be the badge of the Club, which was endorsed by the general meeting.

“During the year a sub-committee, consisting of Messrs. R. Hall, G. A. Kearthland, and D. Le Souëf, C.M.Z.S., was appointed to organize a representative committee of naturalists, sportsmen, agriculturists, and bird dealers, to inquire into and report on the working of the *Game Act*. The matter was carefully gone into, and a detailed report, with a list of suggested alterations, particularly with regard to the date of opening the shooting season for quail and ducks, was submitted for your consideration, and, having been endorsed by the Club, was then submitted to the Minister of Lands by a representative deputation, with the result that there is every prospect of the list as amended being adopted.

“We desire to thank the various authors of papers, leaders of excursions, and others who have contributed their aid in forwarding the work of the Club ; and also Messrs. T. R. B. Morton and G. Coghill for so generously continuing to place their offices at the disposal of the Committee for their meetings. To Mr. J. Searle the Club is also much indebted for his continued kindness in placing his lantern and services at the disposal of the Club.

“The hon. librarian reports that the library has been materially increased by the addition of a number of valuable works, parts of proceedings, &c., while the binding is being proceeded with as funds permit. The use made of the library shows a slight increase, but members cannot be aware of the value of the collection at their disposal or it would be more freely availed of. A properly arranged card-catalogue in connection with the library is greatly needed, and would be much appreciated by members.

“It is with much pleasure that we are able to report the financial position of the Club as most satisfactory. Starting the year with a credit balance of £7 8s. 3d., it concludes with one of £21 7s. 3d., with all accounts paid. The receipts for the year amounted to £131 3s. 7d., while the expenditure was £117 4s. 7d.

“In conclusion, while congratulating members on the continued steady improvement of the Club, your committee would like to draw the attention of our new members especially to the opportunities that exist for doing good work, which, besides benefiting themselves, would forward the interests of natural science. Splendid possibilities are awaiting those who are willing to devote their leisure time to systematic work. Plenty of material is ready at hand, and it is greatly to be regretted that these opportunities are being allowed to slip by, only to be eagerly availed of by the scientists of other countries, the importance of which we shall only realize when too late to remedy.

Only those who know from experience the value of being able to refer to the original types can estimate the enormous dis-

advantages through these being scattered among the numerous museum and private collections in various parts of the world.

"T. S. HALL, *President*.

"J. A. KERSHAW, *Hon. Secretary*.

"Melbourne, 9th June, 1902."

Mr. F. Pitcher, in moving the adoption of the report, congratulated the members on the work accomplished during the year.

Mr. F. Wisewould seconded the motion, which was carried unanimously.

FINANCIAL STATEMENT.

The hon. treasurer, Mr. J. F. Haase, read the financial statement for 1901-2, which was as follows:—

RECEIPTS.

To Balance, 30th April, 1901	...	...	...	£7	8	3
„ Subscriptions	...	...	£102	1	6	
„ <i>Victorian Naturalist</i> —							
Subscriptions	...	£6	2	1			
Sales	...	0	13	0			
Reprints	...	5	1	0			
Advertisements	...	7	10	0			
				19	6	1	
„ Sale of Club's Badges	...	...	...	2	10	0
„ „ Tickets Musical Reunion	...	...	...	7	6	0
					131	3	7
					£138	11	10

EXPENDITURE.

By <i>Victorian Naturalist</i> —							
Printing	...	...	£71	7	6		
Reprints	...	...	4	1	0		
					£75	8	6
„ Rooms—Rent and Attendance	...	...	...	9	0	5	
„ Library—Periodicals	...	...	1	11	8		
Binding	...	...	3	4	0		
Insurance	...	...	0	6	6		
					5	2	2
„ Postages, &c.	...	...	...	12	2	6	
„ Wreath (late J. T. Gillespie)	...	...	...	1	0	0	
„ Expenses Musical Reunion	...	...	...	10	7	0	
„ Club Badges	...	...	...	4	4	0	
					£117	4	7
„ Balance	...	...	...	...	21	7	3
					£138	11	10

J. F. HAASE, *Hon. Treasurer*.
28th May, 1902.

Audited and found correct.

SYDNEY W. FULTON, }
D. BEST, } *Auditors*.

30th May, 1902.

The following statement of assets and liabilities was also read :—

ASSETS.			
Balance in hand ...	...	...	£21 7 3
Arrears of Subscriptions (£50), say...	...	...	27 10 0
Club Badges in hand ...	...	...	2 0 0
Library and Bookcases ...	...	...	120 0 0
			<u>£170 17 3</u>
LIABILITIES.			
Subscriptions for 1902-3 Paid in Advance ...	...	...	<u>£4 15 0</u>

After a short discussion the statement was adopted, on the motion of Mr. J. H. Gatliff, seconded by Mr. F. Wisewould.

OFFICE-BEARERS FOR 1902-3.

The following office-bearers were declared duly elected, being the only nominations received :—President, Mr. T. S. Hall, M.A.; vice-presidents, Messrs. O. A. Sayce and D. Le Souëf, C.M.Z.S.; hon. treasurer, Mr. J. F. Haase; hon. librarian, Mr. S. W. Fulton; hon. editor, Mr. F. G. A. Barnard; hon. secretary, Mr. J. A. Kershaw, F.E.S.; hon. assistant secretary and assistant librarian, Mr. C. L. Barrett.

A ballot for five members of committee resulted in the election of Messrs. E. Anderson, G. Coghill, J. Gabriel, G. A. Kearthland, and F. Wisewould.

A vote of thanks to the retiring office-bearers was moved by Mr. D. Best and seconded by Mr. A. Coles, and carried by acclamation.

The president, Mr. T. S. Hall, M.A., returned thanks on behalf of the office-bearers.

GENERAL BUSINESS.

Mr. J. H. Rutter made some remarks *re* the close season for game, and stated that his experience during the last six or seven years shooting at Gippsland Lakes and Western Port Bay had been that in the majority of cases the ducks were all well matured birds at the opening of the shooting season, and were in large groups, and not in scattered pairs as they occur during the nesting season.

Mr. G. A. Kearthland replied that before recommending any extension of the close season the opinion of most of the leading sportsman was obtained, and they strongly supported the recommendation to alter the date of opening the shooting season to February.

Mr. D. Le Souëf, G.M.Z.S., supported Mr. Kearthland's remarks, and stated that many of the sportsmen stated that they frequently found young birds after the old date of opening the season in December.

PRESIDENT'S ADDRESS.

The president, Mr. T. S. Hall, M.A., then delivered the following address :—

“Ladies and Gentlemen,—The custom of delivering a presidential address has long fallen into disuse among us, but some injudicious remarks on my part at a recent committee meeting induced a combined assault on me, which I was powerless to resist, and hence my appearance before you this evening.

“During the past year we celebrated the twenty-first anniversary of our existence as a club, and I thought that it would be a convenient occasion for me this evening to offer a few remarks on our aims, and how far we have attained or fallen short of them.

“Our long list of members and the attendance at our meetings show that the Club successfully fills what would otherwise be a vacant place in the cultivation of natural science in Victoria. We number amongst us nearly all those who are doing original work in zoology, botany, and geology in the State. But we must recollect that our very success shows us that we should beware how we vary from our present methods. The Club is not specially founded for the forwarding of the detailed study of morphology, nor the long description of new species of all sorts of life. We do not ask here for papers replete with references to previous work, full of minute descriptions of geological strata, and packed with the evidence derivable from long lists of fossils. If we did ask for such, could we, with our limited means, publish them as they should be published, and then distribute them as they should be distributed to the scientific societies of the world?

“I touch on this point, for it has long been before my mind, and has frequently been a subject of discussion with individual members of the Club. What are the aims of a society such as this? Are they the best aims for us, and how far are they being fulfilled?

“What our aims are may best be answered by calling to mind the circumstances surrounding the founding of the Club. Then the only societies in Victoria which paid any attention to natural science were the Royal Society of Victoria and the Microscopical Society of Victoria. There was, as the societies were then carried on, no place where the field naturalist could meet his friends, or his foes, and discuss with them those minor facts which the field worker must know, facts which no book can satisfactorily tell him, but which are handed down by oral tradition. Show me how I can skin this bird so as best to hide the damage it has sustained. Where can I take this or that insect? What sort of paper should I get for my dried plants, and where can I buy it? These, and a host of similar questions were the ones our early members felt

they wanted, some to ask and others to answer. The success of a society which would take charge of such matters was assured from the start. The old societies aimed at describing for the outside world the characteristics of our natural history. The new society, on the other hand, was a body of people anxious to help one another to study what lay around them. This, to my mind, is the fundamental distinction between a society such as this and the Royal Society. Still we have to treat the distinction with a certain amount of latitude. There are groups of animals and plants in which popular interest is always great; groups which, by their beauty, their grace, and their wide distribution, are ever attractive and ever before us. Pre-eminent among such groups are birds, butterflies, and orchids. Groups like these it is permissible for us to study more deeply than others which are not so generally known or so much sought after by the ordinary lover of nature. These latter groups, when treated of in the Club, it is better should be handled with a lighter touch. We can get a full meeting for a paper on the habits, distribution, or specific characters of a bird or a butterfly, and on the paper we can get half a dozen members to speak who probably know as much about the question as the author himself. We can do the same with ferns and orchids, and to a less extent with a few other groups. Outside this range the character of our papers must change. How would our meetings be attended, or what pleasure and benefit would members derive from a series of papers of equal standard dealing with microscopic fungi, fossil echinoids, or a whole host of other organisms. Let me not be misunderstood on this point. We will take papers on any of these subjects gladly, but they must be papers of a certain kind. They must be introductory and explanatory; they must assume no knowledge of the subject on the part of the hearers, or else they will fail in their purpose, which is to instruct and rouse the interest of the members of the Club, and not, as I before remarked, to lay before the scientific world some original contribution to our knowledge of the group in question. It is papers of these two distinct kinds that we in the main require. Such have been our papers in the past, and by adherence to this policy we have reached and maintained the position which we now hold, for the Field Naturalists' Club of Victoria is amongst the most vigorous and useful clubs of its character to be found anywhere in the world, and we must keep it so. It is clear, from our success, that we are meeting the wants of a large number of people by the manner in which the Club is conducted. I do not, of course, wish to be understood as saying that no improvement is possible, for I certainly think there is room for change for the better; but I think that the change should not be made from any mistaken ideas about indefinitely raising the standard of the papers and discussions. We are, before all, a 'popular' scientific Club, and in our own

line we do work no other Victorian society can do. But there are departments of natural science which it is not advisable for us to deal with—branches which require much preliminary training and study to master, and in some of these branches many of our members, who first devoted their attention to science in our ranks, are now recognized authorities. Our society cannot afford to publish their work, and this not only in a monetary sense, but in a still more vital one for the Club's existence, for long papers on subjects in which but two or three members have any personal interest would soon make the *Victorian Naturalist* so change its character as to be valueless to those for whom the Club was founded, and they would again become 'sheep without a shepherd.'

"If I point out where I think no change in the methods of the Club is advisable, I may as well indicate a direction in which I think improvement is possible, and in this I know that many of the members of the Club are with me. At every meeting exhibits are brought forward and laid on the table, and the secretary reads out a list of what is on view. Now, I think that we should devote more attention to this branch of our work, and with this aim the committee some time ago decided that no fresh business should be brought on after a quarter past nine, in order that more time should be available for those present to examine and chat over the specimens. When this alteration was made members were asked to supply a note on their exhibits for inclusion in the *Naturalist*. There are, of course, instances in which such a note is unnecessary, for we do not want merely to pad out our publication with needless paragraphs; but there are many instances where a few lines would be advisable, and under the present method a record is apt to be lost. It is here that I would earnestly advocate a change in our procedure. Our list of exhibits might well take up more space in the *Naturalist* than it does at present. There is, of course, one class of note that the Club would not accept, and that is the description of new species under the guise of a natural history note. A new species is too important a matter to be treated in an off-hand manner on the spur of the moment, and should be handled in the recognized way. If we have a series of short paragraphs of this kind, each with its appropriate heading, it will be possible to notice in the index to the volume much that now is passed over. One member of the committee has suggested that all the exhibits should be indexed, and there is no doubt that there is a good deal to be said in favour of the suggestion. Personally I know an adoption of the plan would frequently have saved me from a great loss of time in hunting a record which I knew was hidden away somewhere in the depths.

"Still, to index every exhibit is, I think, scarcely necessary. The more important should be paragraphed and then indexed,

but the paragraph should be written by the exhibitor, for both the secretary and the editor have quite enough work to do as it is, and the exhibitor should know what points he wishes to draw attention to.

“There is one other point that I should like to enlarge upon, and that is the strange way in which the study of many divisions of both our fauna and flora is being neglected. There is always in all societies a tendency for members to crowd on to one particular branch, and we can illustrate the tendency from our own history. Once the members were all for orchids; later on there was an attack of microscopic fever, and now the air is full of feathers. There is, undoubtedly, an advantage in a combination of forces to carry a position, and I should be the last to ask anyone to throw up his favourite study, in which he was perhaps either doing, or capable of doing, sound work. But there is a danger to the other members, who are, after all, but human. When a large body of investigators is interested in a subject every small fact that is new, or appears to be new, is eagerly seized upon and recorded. Facts in other branches of science, equally as important—for all facts are important—may be noted by the solitary worker, and because he does not find the bulk of the members interested he lets the thing go. It is very wrong of him, and he must be remonstrated with.

“As field naturalists our first aim should be the study of living animals and plants. As it is necessary for us to communicate our results, the first thing we have to do is to attach a label to all ‘the little things we care about.’ You know the first piece of human work on record was the naming of species. Man has been at it ever since, but the end is not yet. There is still abundance of work awaiting the systematist. When we know what names our species are to bear this usually means that we know their position in the scale of life, and we can tell something of their general structure and habits. But we must take nothing for granted. We must prove all things, and it is often surprising the discoveries that are made in the case of the commonest objects. There are many groups in which our members are interested of which we have a very good general knowledge. We know what they are, where they are found, and something about their habits; but it is rather surprising the way in which many are almost entirely neglected. The harvest is crying out for labourers, and why are more not forthcoming? Everyone can add a stone to the cairn of knowledge. You have heard that so often that perhaps it does not come home to you. But I wish every member of the Club to realize that he or she can, if desirous, find out something that no one else knows. Find it out, then, and tell it to us. We will hearken gladly. Mere collecting and storing up in boxes or cabinets is useless, dead and unprofitable. Collect less and study more. It does not matter how

small a compartment of knowledge you occupy. But investigate it thoroughly.

“Let me point out a few of the departments in which we are still very ignorant, and where work is wanted. Above all things our land and freshwater organisms need careful study. The march of settlement and the spread of introduced forms are fast dispossessing the original dwellers, and this work must be done soon or much will be lost. I am not asking anyone who is really working at any marine group to leave it and turn his attention elsewhere. What we want is some of those who are merely taking a general interest in science—in plain words, who are doing nothing—to rouse themselves up and work.

“What do we know of our freshwater algæ, our liver-worts and mosses? When will any one seriously tackle the protozoa of our ponds? Hitherto we have had a few specimens named at random. Others besides myself have tried in vain to get someone to take up this branch. What offers are there? Why will no one tell us of what freshwater sponges we have? Is there anyone who will work out our freshwater polyzoa? Only the other day a naturalist in another State asked me, ‘Is there no one who will study your land and freshwater mollusca?’ and I pass the question on to you. There are other groups, but I pass them by, for here is enough and more than enough to occupy our energies for a long while to come.

“In beginning the study of any of these groups difficulties will be met with, but there are many of our members who will only be too glad to start you on your way, and to show you how to find and use your literature. Our libraries are fairly well stocked, and if there are any books not in them which are necessary for your study the proper authorities have, as a rule, only to be approached for your wants to be met. Have no scruple in asking for directions; those who can help you will be only too glad to do so if they feel that you really mean business.

“In conclusion, let me express the hope that my remarks to-night will bear fruit, that you will apply my suggestions to yourselves and not to your neighbours, that every year will see the fields over which our energies range enlarge, while with it our influence shall increase. We can look back on twenty-one years of successful work. May our future be as bright.”

Mr. F. G. A. Barnard moved a vote of thanks to the president for his excellent address, and trusted that members would bear in mind the president's remarks, especially as regards their exhibits.

Mr. F. Wisewould seconded the resolution, which was carried unanimously.

The president briefly replied.

NATURAL HISTORY NOTES.

Mr. G. A. Kearnland made some remarks regarding the plant *Euphorbia drummondii* poisoning stock, a matter which he had previously brought before the Club, and stated that he had recently received a communication from a gentleman in Central Australia, complaining of the loss of horses through eating this plant. Subsequently a valuable horse was found suffering in a similar manner, and the treatment as recommended in the paper which he had read on the subject was adopted, with the best results.

The President and Messrs. O. A. Sayce, F. Wisewould, and F. Pitcher also discussed the matter.

Mr. D. Le Souëf, C.M.Z.S., stated that a small flock of the little Swallow *Dicæum*, *Dicæum hirundinaceum*, was at present frequenting the Zoological Gardens, this species being rarely seen so near Melbourne.

EXHIBITS.

By Mr. A. G. Campbell.—Pair of Black-chinned Honey-eaters, *Melithreptus gularis*, from Werribee Plains, June, 1902; also a small race of White-eared Honey-eaters, *Ptilotis leucotis*.

By Mr. A. Coles.—Four specimens of *Cypræa decipiens* and one of *C. thersites*, from Western Australia.

By Mr. C. Coles.—Four gizzards, and contents of five others, taken from specimens of Magpie Lark, *Grallina picata*. These birds were found by Mr. A. J. Smith, of Burwood, under one tree, having evidently been poisoned by wheat laid to kill vermin.

By Mr. C. J. Gabriel.—Specimens of *Venus lamellata*, dredged from Port Phillip Bay.

By Mr. R. Hall.—Flock Pigeon from North-Western Australia, showing sky and ground colours as a protection against hawks flying above or beneath them; also recognition marks for others of the species; also Brown Quail, showing an almost total loss of brown and black pigments, with a strong development of greyish-purple—locality, near Melbourne.

By Mr. A. D. Hardy.—European Mole, *Talpa europæa*, from Northumberland, England.

By Messrs. G. A. Kearnland and C. French, jun.—The following rare eggs from Northern Territory, South Australia, described in *Victorian Naturalist* for June by Mr. A. J. North, C.M.Z.S.:—White-eyebrowed Water Crake, Burdekin Duck (Radjah Sheldrake), Eyton's Tree Duck, Whistling Tree Duck, Pigmy Goose, Great Bower-bird, and Rainbow Pitta. Also, the following since received:—Royal Spoonbill, Jabiru, White-quilled Pigmy Goose and skins, and skin of the Masked Owl.

By Mr. H. B. Williamson.—The following dried plants from new localities:—*Helichrysum rutidolepis*, De C., new for N.E.; locality Murray River, near Rutherglen, 12/01. *Kochia brevifolia*,

R. Br., new for S. ; Geelong, 1/96. *Festuca hookeriana*, F. v. M., new for S.W. ; Hawkesdale, 12/01. *Lepidosperma elatius*, Labill., new for S.W. ; Hawkesdale, 11/01. *Bellis perennis*, L., Port-land district; well established, 1894 and 11/01; perhaps not recorded as naturalized in Victoria. *Calocephalus citreus*, Lessing, new for N.E. ; Murray River, near Rutherglen, 12/00. *Calotis anthemoides*, F. v. M., new for S.W. ; Dunkeld, 11/01. *Poa lepida*, F. v. M., Coast Hills, Port Fairy, 11/01. *Chorizandra cymbaria*, R. Br., new for S.W. ; Hawkesdale, in Great Swamp, 12/01. *Eucalyptus dives*, Schauer, new for S.W. ; Grampians, 12/01. *Cyperus tenellus*, L., new for S.W. ; Hawkesdale, 11/01.

After the usual conversazione the meeting terminated.

DESCRIPTIONS OF SOME NEW MALLOPHAGA FROM MARSUPIALS.

BY S. A. LE SOUËF.

(Communicated by D. Le Souëf)

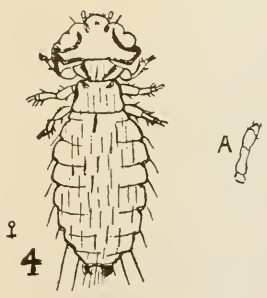
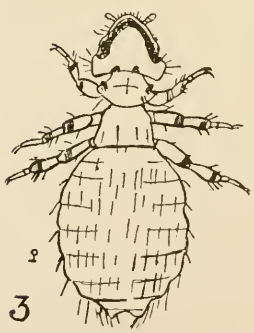
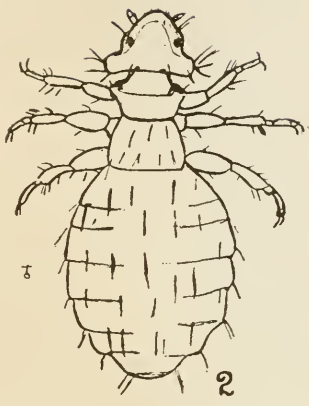
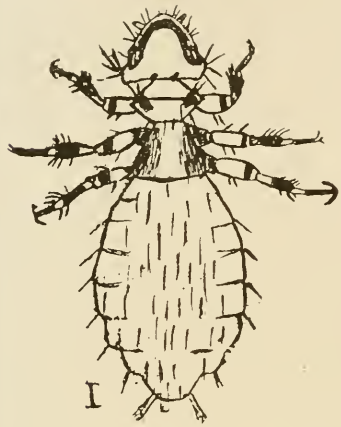
(Read before the Field Naturalists' Club of Victoria, 10th March, 1902.)

1. BOOPIA NOTA-FUSCA, found on Black Wallaby, *Macropus ualabatus*.

Dirty white, with light chestnut markings on upper parts of the body and legs; head equilateral; clypeus convex and smooth, with a broad chestnut band posteriorly extending to the base of a wide, shallow lateral sinus, in the anterior part of which the eyes are situated; palpi with distal end a little enlarged; antennæ capitate; eyes large and convex; temporal angles truncate; a chestnut patch on each side of occiput; prothorax elliptical, nearly as long as broad; metathorax sub-conical and truncate; legs long, first joint chestnut, second pale with chestnut ring distally, third chestnut on distal two-thirds; first tarsal joint with a small nodule inferiorly; second tarsal long and slightly curved, chestnut with numerous very fine hairs inferiorly; ungues large, finely serrated on under surface; abdomen ovate, the sides being wavy. Length 1.76 mm., breadth .80 mm.

2. BOOPIA BETTONGIA, found on Jerboa Kangaroo, *Bettongia rufescens*.

Pale yellowish-white and smooth; clypeus convex; palpi slightly clavate and long; antennæ with last joint produced to a blunt point; eyes slightly convex, with a strong spine growing out of the socket; basal angles produced and rotundate; base slightly concave; prothorax large, broader than long, with three spines on the lateral margin, rotundate posteriorly; metathorax quadrate, concave anteriorly and truncate posteriorly; legs pale, second tarsal joint stout and curved, with a double serrated ridge inferiorly; abdomen ovate, bluntly serrated laterally. Length 1.60 mm., breadth .67 mm.



S. A. LE SOUËF, Del.

Process Block. TRIUMPH ENG. CO.

NEW SPECIES OF MALLOPHAGA.

3. *BOOPIA MINUTA*, found on *Dorsalis* Wallaby, *Macropus dorsalis*.

Pale yellowish-white; head tawny yellow, darker anteriorly; clypeus semilunar; palpi long and slightly clavate; antennæ with last joint produced to a blunt point and flattened posteriorly; temporal angles broad and truncate; eyes slightly convex; base convex; prothorax elliptical, truncate anteriorly and rotundate posteriorly, slightly broader than long; metathorax sub-conical and truncate; legs, a chestnut ring on distal femur and tibia, second tarsal joint has several transverse rows of small hairs inferiorly; abdomen ovate, bluntly serrated laterally. Length 1.18 mm., breadth .60.

Genus.—*LATUMCEPHALUM*.

Generic characters:—Head broader than long, three divisions on lateral margins; eyes small; palpi apparently two-jointed, but in reality four-jointed, first very short and fourth and fifth welded together; antennæ four-jointed; abdomen deeply serrated laterally; tarsal joints nearly equal in size; two ungues.

4. *LATUMCEPHALUM MACROPUS*.

Colour whitish; head flattened, cone-shaped, with three depressions or slits on the lateral margins, about one and a half times as broad as long, with truncate basal angles and sinuously concave base; chestnut markings round basal margins and on the inner side of a wide, shallow sinus which holds the antennæ; clypeus narrow and semilunar; palpi exerted, four-jointed, first very short, second long and cylindrical, fourth and fifth clavate and welded together; antennæ stout and capitate, first joint semi-cylindrical, second globular, third pedunculate, and fourth semi-globular; prothorax transversely elliptical, slightly concave anteriorly and convex posteriorly, lateral angle acute; metathorax somewhat quadrate, concave anteriorly and convex posteriorly, with depression in each lateral margin; legs robust, first tarsal joint a little smaller than the second; abdomen oval, nine segments, bluntly and deeply serrated laterally. Length 1.15 mm., breadth .44 mm. Found on the skin of the Wallabies. Feeds on epidermis. Rather sluggish in movements.

EXPLANATION OF PLATE.

- | | |
|--------------------------------------|--|
| 1.— <i>Boopia nota-fusca</i> (male). | 4.— <i>Latumcephalum macropus</i> (fe-
male). |
| 2.— <i>B. bettongia</i> (male). | 4A.—Do do—palpi. |
| 3.— <i>B. minuta</i> (female). | |

RECENT PUBLICATIONS.

“CATALOGUE OF NESTS AND EGGS OF BIRDS FOUND BREEDING IN AUSTRALIA AND TASMANIA.”—The second part of this publication, the general plan of which was given in the *Victorian Naturalist*, vol. xvii., p. 66, has recently been issued. The

portion under notice, pages 37-120, deals with the Bower-birds (continued), Orioles, Wood-Shrikes, and Cuckoo-Shrikes, embracing altogether thirty-one species, though it is remarked that the nests and eggs of Newton's and the Tooth-billed Bower-birds are still unknown to science. Good illustrations are given of the bowers of the Spotted and Great Bower-birds, and among other noteworthy illustrations are the nest and eggs of the Cat-bird, the nest of the Rufous-breasted Shrike-Thrush, and a peculiarly situated nest and egg of Jardine's Caterpillar-eater. The part includes three plates of eggs, figuring some sixty specimens, which in the coloured edition faithfully reproduce the natural appearance of the eggs. The author, Mr. A. J. North, C.M.Z.S., and the illustrator, Mr. N. Cayley, are to be congratulated on the successful carrying out of their respective parts.

"A MONOGRAPH OF THE CULICIDÆ OR MOSQUITOS."—The fact that malaria and some other diseases are communicated by Mosquito bites has led to the concentration of a considerable amount of attention on the Culicidæ. The necessity of identifying the different species was, of course, felt, and it was then realized that, as a matter of fact, this branch of work had been much neglected in the past. Several important monographs have appeared on the anatomy of certain species, and there has just been issued by the British Museum "A Monograph of the Culicidæ or Mosquitos," which will make the study of the family simple in comparison with what it once was. The author is Mr. F. V. Theobald. The work is in two volumes of the size and appearance of the well-known British Museum catalogues, and is accompanied by a volume of coloured plates. The family does not seem to be extensively represented in Victoria, though doubtless further species will be discovered on a more careful search. We notice, however, *Culex frenchii* recorded as a new species.

"THE EMU."—The July number (vol. ii., part 1) of this publication contains a number of interesting ornithological articles, two of which are illustrated, while under the title of "Stray Feathers" a variety of notes relating to birds are gathered together from all parts of Australia. Mr. A. J. Campbell furnishes a report on the Mutton-bird "rookeries" at Phillip Island, which he visited at the end of March last. Six of the seven existing rookeries were examined, four of them being found in good order, but the other two seemed to have been somewhat depleted by egg-gatherers and birding parties. A copy of the report was forwarded to the Chief Inspector of Fisheries, who administers the *Game Act*, and on his recommendation it has been decided to close the Red Cliff and Nobby rookeries for four years from September next, and to require egg-gatherers at the other rookeries to register their names with the local assistant inspector.

The Victorian Naturalist.

VOL. XIX.—No. 4. AUGUST 7, 1902.

No. 224.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE special meeting of the Club was held in the Royal Society's Hall on Monday evening, 14th July, 1902. Mr. O. A. Sayce (one of the vice-presidents) occupied the chair, and about 40 members and visitors were present.

CORRESPONDENCE.

The hon. sec. read a communication from the Royal Geographical Society of Australasia, Queensland Branch, stating that arrangements had been made to celebrate, on the 1st August next, the 83rd birthday of their first president and honorary councillor, the Hon. Augustus Charles Gregory, C.M.G., F.R.G.S., one of the greatest Australian explorers, when addresses appropriate to the occasion would be delivered and presentations made to Mr. Gregory, who, in replying, will allude to his contemporaries in the field of Australian exploration and discovery, and the society invited the Field Naturalists' Club to take part in the celebration.

The hon. sec. mentioned that the committee had asked Mr. F. M. Bailey, F.L.S., Government Botanist of Queensland, to represent the Club on the occasion.

REPORT.

The hon. sec. read a report from the sub-committee (Messrs. C. C. Brittlebank, G. A. Kearnland, and J. A. Kershaw) appointed to draft a reply to a report forwarded by Mr. C. W. Maclean, Inspector of Fisheries, from Constable Carey, of Whittlesea, regarding the wholesale destruction of native birds through eating poisoned grain laid for rabbits. The sub-committee fully upheld the constable's statements, and these were endorsed by all the evidence obtained on the subject from various parts of the State, and stated that among the birds and mammals destroyed in this manner were Cockatoos, Parrots, Bronze-wing Pigeons, Satin Bower-birds, Magpies, Quail, &c., and Opossums, and where "Toxa" poison is used many honey-eating birds are killed. It was pointed out that as the law at present stands farmers are compelled to lay poison to destroy the rabbits, and it was urged that some means other than that now used be adopted. With this view it was suggested that the use of bisulphide of carbon to suffocate the rabbits in their burrows would be more effectual, and would destroy both the young and old at the same time without causing the serious loss among the native birds.

The report was discussed by several members, mainly as to the best means of destroying the rabbits without injury to the native birds.

The report was adopted, on the motion of Mr. J. Shephard, seconded by Mr. A. J. Campbell, and ordered to be sent on to the Inspector of Fisheries.

Mr. G. Coghill moved—"That a standing committee, consisting of Messrs. C. C. Brittlebank, G. A. Keartland, J. A. Kershaw, and O. A. Sayce, with power to add to their number, be appointed to deal with all matters similar to the above as they arise." This was seconded by Mr. D. Best and carried.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. R. A. Bastow, 183 Brunswick-street, Fitzroy, Mr. Alister Clarke, Bulla, and Miss Gweneth Wisewould were elected as ordinary members, and Mr. H. W. Davey, 55 Drummond-street north, Ballarat, as a country member of the Club.

ALTERATION TO RULE.

Mr. J. Shephard moved the following alteration of rule 6:—"That the words 'subscription shall have been paid, or while his subscription is in arrears' be omitted, and the words 'first subscription shall have been paid, or while any subscription subsequently due is more than six months in arrear' substituted."

In speaking to his motion, Mr. Shephard said that he thought it would be to the advantage of the Club to allow a little more latitude in the payment of subscriptions than was provided by the present rule, which debarred any member who had not paid his subscription from taking part in the annual election of office-bearers, and was supported in his remarks by Mr. F. Pitcher, who seconded the motion, and by Messrs. A. J. Campbell and A. D. Hardy.

Mr. F. Wisewould expressed himself strongly in favour of the present rule, which had been in existence for some fifteen years and had been a most useful rule.

Mr. J. F. Haase said that from his experience as treasurer he considered the rule a most valuable one, and that it saved the treasurer a considerable amount of work.

Messrs. Sayce, Best, and Coghill also spoke in favour of the existing rule, and the motion on being put to the meeting was lost.

PAPERS.

1. By Mr. Jas. A. Kershaw, F.E.S., entitled "Notes on a Rare Victorian Shark."

The author gave a detailed description of a large Basking Shark, *Cetorhinus maximus*, which had recently been captured in

Hobson's Bay, off Williamstown, and gave a detailed account of the habits and distribution of the species. The specimen measured a total length of 12 feet 11 inches, and was peculiar in that the front of the head was greatly extended, and formed a thick, fleshy snout, the extremity of which terminated in a fleshy hook. It is the second specimen of the species recorded from Victorian waters.

Some photographs of the fish and of some of the teeth (enlarged) were exhibited in illustration of his remarks.

The chairman, Mr. O. A. Sayce, and Mr. A. D. Hardy made some remarks on the paper.

2. By Mr. A. J. North, C.M.Z.S., entitled "*Eremiornis carteri*."

The author stated that he had forwarded examples of Carter's Desert-bird to Dr. P. L. Sclater, secretary of the Zoological Society, London, who, when exhibiting them before the British Ornithological Club, remarked :—"The genus is closely allied to *Schœnicola* of India, and perhaps hardly distinct; but the specimen is not in very good condition, and I am unable to decide definitely upon it." Mr. North stated that after comparing specimens of the two genera he was strengthened in his opinion that although *Schœnicola* and *Eremiornis* bear a close resemblance to each other they are quite distinct, and described the differences in detail. A photograph of the two birds was exhibited to illustrate his paper.

3. By Mr. Frank Madden, M.L.A., entitled "Notes on the White Ibis," communicated by Mr. G. A. Keartland.

The author gave a very interesting account of the habits of the White Ibis, *Threskiornis strictipennis*, emphasizing its value in keeping in check the swarms of locusts and other insect pests, as the Sacred Ibis does in Egypt, and stated that farmers should do everything in their power to protect and encourage these birds to increase and multiply. He stated that though on the list of protected birds permits can be obtained to allow keeping them as pets in gardens, where they would do infinite service in keeping down injurious insects.

NATURAL HISTORY NOTES.

Mr. G. A. Keartland mentioned that a new Grass-Wren, named *Amytis housei* by Mr. A. W. Milligan, of Perth, had been discovered by Dr. House while on the recent Kimberley Exploring Expedition in North-Western Australia. A White Cockatoo was also taken, which had been referred to as doubtfully new on account of its smaller size as compared with *Cacatua galerita*. Mr. Keartland remarked that he obtained a specimen of this bird when at Derby, North-Western Australia, and drew attention at the time to its smaller size.

EXHIBITS.

By Mr. A. Coles.—Stuffed specimen of Blackfish, *Gadopsis gracilis*, caught in the Bunyip River. Weight, 5 lbs. 4 ozs.; length, 24 inches.

By Mr. C. French, jun.—Twig of apple tree showing seeds of mistletoe (*Loranthus*) germinating. The seeds of mistletoe are disseminated by the birds known as the Swallow Dicæum.

By Mr. J. A. Kershaw, F.E.S., for the National Museum, Melbourne.—Photographs of Basking Shark, *Cetorhinus maximus*; also of teeth of same (enlarged), in illustration of paper.

By Mr. A. J. North, C.M.Z.S.—Photographs of *Schaenicola platyura* and *Eremiornis carteri* (natural size) in illustration of paper.

After the usual conversazione the meeting terminated.

ON THE SHELL-FISH FOOD REMAINS OF ABORIGINALS.

BY D. LE SOUËF.

(Read before the Field Naturalists' Club of Victoria, 14th April, 1902.)

IN days gone by the aborigines who inhabited the vicinity of the sea-coast seem to have lived largely on shell-fish, and during the course of ages—how long we do not know—enormous quantities of shells have gradually been heaped together, in many places forming mounds of considerable height—for instance, in Northern Australia, on the shores of the Gulf of Carpentaria. Mr. W. E. Roth says:—"Between the junction of the Hey and Embley Rivers are to be found middens of burnt shell, mainly of *Arca granosa*, some of the mounds reaching to a height of over thirty feet, and dotted over a distance of from a quarter to half a mile in length. On the tops of them may be seen remains of fires and huts, the shells, after cooking, having been thrown down the sides. Considering that the total number of tons of shells comprising these mounds must be reckoned in hundreds, probably thousands, and that the local population is comparatively scarce, the process of their formation has evidently been going on for several generations past."

Personally I have not seen any mounds of a similar size on the Victorian coast, although it is quite possible they exist, but whether you go along the ocean beach or the shores of the bay, or many of the river banks, you will find evidences of the former existence of natives by the remains of their kitchen middens and the bones and shell remains scattered about them. For instance, take the ocean beach at Sorrento as a sample of the rest. There you will find on the top of the cliffs, or on sand hummocks now more or

less covered with dense scrub, large deposits of shells, consisting principally of Limpets, *Patella tramoserica*, Cockles, *Natica plumbea*, Haliotis, *H. naevosa*, Mussels, *Mytilus latus*, Oysters, *Ostrea edulis*, also *Purpura succincta* and *Scutus anatinus*. Then, again, as these sand hummocks gradually get blown away by the wind, deposits or strata of shell, together with soil which has been mostly darkened and discoloured by the action of fire, will be noticed exposed at varying distances from the present surface; these shell remains again collect at the bottom of the hollows so formed, with any stones that may have been used for the old fireplace. These again get covered up by sand, but the deposits so formed are easily recognized by the absence of any sand discoloured by fire, and also the more delicate parts of the shells, especially in Haliotis, have crumbled away through being exposed to the weather, whereas in deposits left where thrown by the natives, most of the Haliotis shells, though partially decomposed, are entire. The Cockles and similar shells have all been broken, so as to extract their contents, and it is seldom that a perfect one is found, but the Haliotis and Limpet shells are of course unbroken, except that the latter have a small portion of the rim always broken off, where the natives struck them with a sharpened stone or jagged end of a bone to disengage them from the rock to which they clung.

The natives generally made their fires in shallow hollows, and when the fire was well started threw stones into the flames, and when a sufficient number had been thrown in and thoroughly heated, they took the stones out, and placing their food in the hollow, covered it with the heated stones and so cooked it. At Sorrento dune-sandstone was the principal kind used for this purpose, and these stones soon became blackened by the action of the fire, and many of the remains of those made on firm soil may still be seen, but the burnt stones of those made in the sand hummocks have long ago been scattered from their original position by the action of the wind, and round these old fireplaces is where the shells are found, although, as before stated, many large deposits of shells may now be found among the sand hummocks without any sign of a fireplace, that having been destroyed by wind; but, if originally made on firm soil, the remains of the fireplace will generally be found. The natives evidently did not roast the shell-fish to any extent in their shells, as very few of these are much burnt; they probably put them in the fire just long enough to kill the occupant and make it easy to extract, although it may have been subjected to more cooking afterwards.

Near these old fireplaces, some of which appear to have been used for a considerable time, judging by the large accumulation of shells, native weapons, also the stones and jagged pieces of

bone they used for knocking the Limpets and *Haliotis* shells off with, as well as smaller sharp stones, splintered off from a larger piece, probably by pouring water on a heated stone. These they evidently used to cut up their food with, as remains of Kangaroos, Wallabies, &c., are found at these old feasting-places, as well as shells, and occasionally stones are found that they used for crushing and grinding up certain seeds, with which they made paste for food.

It is interesting to notice how these ancient middens, if we may so call them, show us how the sea coast is gradually altering. For instance, we may find a large deposit of shells, whereas in the sea opposite there are no rocks on which the shell-fish could live, showing conclusively that the rocks were there formerly, but have been worn away by the action of the sea. On the shores of Port Phillip Bay much of the coast on the western side has been so eaten away, and therefore most of the shell deposits, as left by the natives, have disappeared, but on the eastern side they may still be found, and are almost continuous, in varying quantities, depending, of course, on the amount of rock exposed at low tide opposite, but they do not seem to be found to any considerable depth, there being, for instance, no sand hummocks to bury them, and I do not think that the depth at which these old fireplaces are found gives us much clue as to the time the natives have been here, as the bay is gradually extending, through the action of the waves, and therefore the natives would have their middens shifted further and further back as the sea encroached.

When visiting our sea shores I have heard over and over again that the fact of these shell deposits being where they are show that the shores have risen, and that what was once a shell-covered sea bottom is now dry ground and many feet above high-water mark, and it is probably that many of my hearers may be of the same opinion, and I have written these few brief notes and brought the specimens with me this evening so that it may be an inducement to them to make further research when visiting these interesting localities. Anywhere round our coast line they will probably find ample evidences of what has been stated, and if they can write short notes on anything of interest they may find so much the better.

Shells which may have been occasionally blown a short distance inland from the beach are easily recognized from those brought by the natives, as they are much worn by being washed to and fro in the surf, their thinner parts being often worn away through abrasion, mostly on the apex, and *Haliotis* shells are invariably broken, but such shells are generally scattered, and rarely found in any quantity at one place.

[The paper was illustrated by a series of lantern slides.—ED.
Vict. Nat.]



E. A. del.

GASTROPHORA HENRICARIA, Gn.

Male, female, and larva.

NOTES ON THE MOTHS *GASTROPHORA HENRICARIA*
AND *PHALLARIA OPHIUSARIA*, Gn.

BY ERNEST ANDERSON.

(Read before the Field Naturalists' Club of Victoria, 12th May, 1902.)

IN submitting a few notes upon these two species I may remark that I am led thereto by Meyrick's note respecting the allied genus *Monoctenia*, of which he says:—"The species are very retired in habit in the imago state, and it is not unlikely that their number may yet be considerably increased by rearing the larvæ, of which little is known."

These remarks apply with equal force to *Gastrophora* and *Phallaria*, hence any advance upon our present recorded information should be of value, and has induced me to record such particulars of their economy as I have been able to discover.

The Geometers are chiefly small moths of slender structure, but in the family *Monocteniadæ* we find genera in which this rule is departed from; thus *Gastrophora*, *Phallaria*, and the typical genus *Monoctenia* are composed of comparatively robust species attaining considerable size. All of these must be considered rare, and as a rule are not likely to be met with by those unacquainted with their habits and time of appearance. The characteristic marking is simple enough, consisting of a line or narrow band across the wings, starting about the centre of inner margin, and running either to the centre of costa, or more often to the apex of the wing. As these moths rest during the daytime they furnish a good example of protective resemblance, their colouration matching withered leaves; the line across the wings representing the midrib of the leaf.

GASTROPHORA HENRICARIA, GN.

My first record of this beautiful moth is November, 1890, when I found a male at rest at Bayswater. It had been very stormy the night before, but the specimen was in first-class condition. It was found high up on the ranges. The following year a specimen was secured by one of the members attending the F.N.C. camp-out at the Grampians, this specimen being a female. Apparently, however, no attempt was made to obtain ova, and to the best of my knowledge no further Victorian captures were made until four years later, when Mr. Spry captured two specimens at Box Hill (26th December, 1895).

Recognizing the importance of his capture, Mr. Spry took special care to obtain ova, and fortunately was successful. The young larvæ emerged almost immediately, and on the 20th January I received eleven specimens from him. They were then of a steely-drab colour, almost black, and about 1 inch long, but so voracious were they that in three days they had doubled their size, and then became mottled with various shades of brown.

Having moulted, they continued feeding, readily devouring any species of eucalypt given them, but choosing always the young shoots and tender leaves, the old ones being rejected. They were active in getting about, and would roam all over the cage when looking for a further supply of food. The rapidity of their growth was marvellous. When full fed one died during very hot weather prevalent at the time; the others pupated just beneath the surface of the ground. Three went down on 10th February, the others during the next few days, the larval stage thus taking about six weeks. The full-fed larva is sienna-brown, with lateral stripes of a lighter colour, the general appearance being very much like a piece of stringy-bark. As if aware of this protective resemblance they generally attach themselves to the bark, or stay among the small stems by day, remaining motionless, with the legs extended, as shown in the figure. At dusk they make their way to the end of the branches, feed ravenously during the night upon the tender young foliage, returning at break of day to their retreats. There are sub-dorsal projections on the 7th and 8th segments but no anal horn.

Although all the brood hatched from the ova simultaneously and changed to the chrysalis stage within a few days of each other there was a very wide disparity in the dates of emergence. The first moth, a male, came out on 12th March, and another male on 19th July. Up to this date Mr. Spry had not reared any, but between this date and the end of the month a number of his specimens emerged, the cage being kept in the open, and the weather cold and inclement. On 2nd and 4th August females appeared, on 17th November 2 females, 24th November a male, and 12th December a male, making 8 specimens reared from the 11 larvæ originally received.

Mr. Spry succeeded in obtaining ova from the specimens he reared, and on 13th October gave me about 20 young larvæ about three-quarters of an inch long. The rest of the brood retained by him were attacked by fungus, and all died in a week's time. Mine fed for a month, and attained a large size, but early in November they all died during a heat wave. Had they lived they would probably have pupated before the last one of the previous brood had emerged.

It is hard to determine, in view of such irregular emergence, whether this species is single or double brooded. Possibly it is really a northern species, probably double brooded there, and extending its range southward, may be with us in a transitory stage, in which inherited tendencies are fighting against climatic influences.

I mentioned in my opening remarks the resemblance these moths at rest have to leaves, but looking at specimens set out in collections one would hardly expect this to be the case, for the



E. A. del.

PHALLARIA OPHIUSARIA, Gn.

Moth (female) and larva.

decided markings and vivid orange underwings of the male seem so distinct that apparently it would require some very exceptional and abnormal leaves to in any way match it; but when at rest the orange underwings are folded beneath the forewings and concealed, while the insect avoids green leaves, settling down either amid dead leaves on the ground, or on some broken branch having withered, discoloured leaves. In these situations it easily escapes notice. The female also hides the underwings, and the forewings being without the bar across, and speckled all over, assimilate even more closely with the cover selected.

PHALLARIA OPHIUSARIA, GN.

This species differs both in appearance and habits from the preceding one. The colouration is more subdued, nor is there so marked a difference between the sexes. The method of resting is also dissimilar, as this species rests with the underwings almost entirely exposed. The protective resemblance possessed by the insect is, however, fully equal to that of *G. henricaria*, and, like it, it is leaf-like, only, in place of representing a portion of a leaf, *P. ophiusaria* resembles an entire leaf.

Whilst collecting at Spring Vale during the month of March I disturbed a female of this species from a dead branch of a small gum tree growing in the heath ground. It was easily captured, flying in a bewildered sort of manner, and finally pitching down amid the scrub a short distance away. From this I obtained ova, which were globular and of a dull greenish-white. On the 23rd they slightly changed colour, and hatched on the 30th. The young larvæ were very dark brown, almost black, the head looking very large and disproportionate. As Meyrick mentions *Leptospermum* as a probable food, and as the moth was found in a locality where that plant largely prevails, I put them on that food, but took the precaution to also introduce some tender eucalyptus shoots. This was fortunate, for they would have nothing to do with the *Leptospermum*, but took readily enough to the other, at once attacking the edges of the leaves instead of gnawing the epidermis or eating round holes, as most young larvæ do.

They fed by night only, resting straight out from the food and motionless by day. They grew very slowly, being in marked contrast to *G. henricaria* larvæ. By 25th May, nearly two months after hatching, they were only just over an inch long. However, though slow, they fed steadily enough throughout the winter months, and in another three months—that is, by the end of August—some were a large size. They always went down to the *débris* at bottom of the cage when about to change their skins, an operation taking some days to complete. It was not until the end of October that they began to pupate, forming a

very loose cocoon of moss and earth on the surface of the ground or just beneath it. A few fed on to the end of November.

The full-grown larva is $2\frac{1}{2}$ inches in length, stout and somewhat stumpy looking, head flat and slightly retracted; legs ten, the true legs being folded tightly together when the larva is at rest; a curved horn on twelfth segment. Colour varies from putty colour to dark smoky-brown. There is a dark dorsal line extending from the horn about half-way towards the head. Immediately after the thoracic segments underneath is a light-coloured patch, and the 7th and 8th segments each have conspicuous white blotches on the side.

These larvæ are very sluggish, remaining absolutely rigid during the day time, even if touched, and crawling very slowly at night, stopping instantly if a light be brought near.

The first moth emerged on 26th February, and they continued appearing until the end of March, invariably emerging very late at night.

NOTES ON A RARE VICTORIAN SHARK.

BY JAS. A. KERSHAW, F.E.S., Curator of the Zoological Dept., National Museum.

(Read before the Field Naturalists' Club of Victoria, 14th July, 1902.)

ON the 2nd May last a large shark was captured in Hobson's Bay, off Williamstown, which was quite unknown to any of the fishermen and others who saw it. It was captured through becoming entangled in the nets of some local fishermen, which it damaged considerably, and unfortunately bruised itself a good deal in its powerful struggles to escape.

Its captors immediately disembowelled it, and had it conveyed to the city for exhibition purposes, where it was secured for the Museum.

It proved to be a medium-sized male specimen of the Basking Shark, *Cetorhinus maximus*, Gunner, and measured a total length of 12 feet 11 inches.

This species, which is the only one of the genus, is a very rare visitor to Australian waters, but is well known in the European seas, and particularly along the British coasts, where it is frequently found entangled in the herring nets of the fishermen. On the west coast of Ireland it is regularly hunted for the sake of the large quantities of valuable oil obtained from its liver, one fish yielding from a ton to a ton and a half. A specimen captured in Cornwall, which measured 31 feet 8 inches long, is stated to have yielded 198 gallons of oil, and medium-sized specimens are valued at from £30 to £40 each. This is probably the largest species of shark known, and attains a total length of from 35 feet to 40 feet. At certain seasons it is gregarious, and con-



CETORHINUS MAXIMUS, GUNNER.



CETORHINUS MAXIMUS.

Fig. 1.—Front view of head, to show the small teeth and position of eyes and nostril.
" 2.—Teeth of same, magnified $1\frac{1}{2}$ diameters.

gregates in very large shoals of from 60 to 100 and more individuals, when they may be seen occasionally leaping out of the water to a height of several feet. It is of a quiet, sluggish nature, and is frequently observed lying motionless on the surface, with its large dorsal fin projecting out of the water, and basking in the warm rays of the sun, hence the names Basking Shark, Sun-fish, Sail-fish, &c., by which it is known.

Unlike the majority of sharks, it is quite harmless if not interfered with, and will permit a boat to come almost in contact with it without showing any alarm—in fact, it is recorded that one specimen captured at the Isle of Wight actually made no resistance to a rope being passed round its tail and being dragged quietly along.

It is, however, a very dangerous customer when attacked, and great care must be taken to keep the boats out of reach of its powerful tail, a blow from which would easily sink them.

The only previous record of its occurrence in Victorian waters is that given by Sir Frederick M'Coy in the *Prodromus Zoology Victoria*, vol. ii., where he describes and figures a large specimen measuring 31 feet 6 inches, which was captured in the fishermen's nets at Portland in November, 1883. This specimen was exhibited in the city for some days, but, being hot weather, it was rendered useless for museum purposes.

The only other record of its occurrence on the Australian coast is that of a small specimen measuring only 9 feet long, which was captured at Twofold Bay on the New South Wales coast last year, and is included in the list of additions to the Australian Museum, Sydney, for 1901, which were published in the Museum "Records," vol. iv., No. 6, issued in May last.

About a year ago a fisherman from Queenscliff mentioned to me that a large shark had been recently caught inside Port Phillip Heads which was quite a stranger to the fishermen at Queenscliff, and which he described as having a long, thick snout, terminating in a hook. No attempt was, however, made to preserve the specimen. This was probably the same species as the present one.

The specimen recently captured differs considerably in general appearance from the one figured in the "*Prodromus*," in that the front of the head is considerably extended, and forms a thick, fleshy, truncated snout, with the extremity produced into a curved, fleshy hook, which altogether gives the fish a most extraordinary appearance. This peculiarity, according to some earlier observers, occurs only in the young specimens, and has led to the erroneous opinion that several different genera and species of Basking Sharks existed, an opinion which can hardly be wondered at considering the greatly different appearance this gives to the fish.

The gill-slits are also very much longer than those shown in the

figure of the Portland specimen, extending along the whole side of the neck, the first pair meeting within three inches on each side of the dorsal surface, while they practically join under the throat.

The particularly flabby condition of the branchial cavities gives to the head a most singular appearance in specimens lying dead on the ground.

In colour this specimen is of a uniform brownish-black on the upper surface, and becoming a dirty white with a slight yellowish tinge, particularly under the throat, on the under side. The skin is covered all over with numerous irregular short wrinkles or folds, and is very rough to the touch, especially when the hand is passed along from the tail towards the head, owing to the presence of innumerable minute curved spines directed backward. These are more noticeable on the snout, where they can be distinctly seen with the naked eye. The snout is covered with numerous small mucous pores which occupy the top and sides, disappearing below the eyes. The spiracles are small, and situated directly above, and in a line with, the angle of the jaw. The eyes are placed low down on the sides of the head, near the edge of the upper jaw, and about three inches from the nostrils, which are on the edge of the upper lip.

The teeth in this specimen are arranged in two to three rows round the edge of each jaw, and are extremely small, rounded, simple and conical, and terminate in a sharp, slightly-curved point. They are directed inwards, towards the interior of the mouth, with their points curved downwards, and are fixed to the skin of the jaws by a small pedestal of hardened material. In the fresh specimen only the smooth, rounded, central portion of the teeth is exposed, the base and points being embedded in the surrounding flesh of the jaw, so that they look very much smaller than they really are.

On the inside of the teeth row is a row of what at first sight appears to be teeth, but which are soft, white, swollen bodies, of exactly the same form as the teeth proper. As the skin of the jaw shrinks in drying, these collapse, and are represented only by small, flat, triangular-shaped pieces of white skin—in some instances with the lower part which connects them with the skin of the jaw more or less hardened, evidently showing the commencement of the growth of another inner row of teeth. In the larger specimens described the number of rows of teeth are usually given as five and six. In the specimen from Portland Sir F. M'Coy mentions six rows in the lower jaw and five in the upper, the largest tooth measuring $\frac{1}{4}$ inch. In the present specimen there are only two to three rows, and the largest tooth measures $\frac{1}{8}$ inch long and $\frac{1}{16}$ inch broad.

The gill openings are five in number on each side, and are said

to contain rays or fringes of a substance like whalebone, which act as strainers, and serve to retain the large quantities of minute animals upon which the fish feeds. These fringes were referred to by Bishop Gunnerus as early as 1766. Günther says :—" The branchial arches of *Selache* (*Cetorhinus*) are provided with a very broad fringe of long (5 to 6 inches) and thin gill-rakers, possessing the same microscopical structure as the teeth and dermal productions of sharks. Similar gill-rakers have been found in a fossil state in the Crag of Anvers in Belgium, proving the existence of this *Selachian* type in the tertiary epoch." I could, however, find no indication of them in the present specimen.

Regarding the food various suggestions have been made, such as medusæ, seaweeds, small fish, &c. Dr. Günther says :—" Its food consists of small fishes and other small marine animals swimming in shoals." Sir E. Home, referring to a specimen which he examined, states :—" The contents of the stomach consisted of several pails full of pebbles, a quantity of mucus, and a small portion of a substance which proves to be the spawn of a univalve ;" while Sir Frederick M'Coy states that a sample of the contents of the intestines of the Portland specimen was " altogether composed of body and shells of a species of the genus *Cuvieria* or *Triptera* (*Pteropoda*), the mass being tinted of a 'boiled-shrimp' red from the remains of the soft parts." There is no doubt that its food largely consists of similar kinds of minute oceanic animal forms as that of the whale.

Nothing appears to be known so far of the reproduction of this shark, which has been recorded so long ago as the year 1662 from Norfolk, England. Sir E. Home, in his "anatomical account" of this species, states that it "appears in many respects to be similar in its structure to the shark, but it differs essentially from it in the form of the stomach, and in that respect forms an intermediate link between the shark and the whale." Low mentions that the flesh was eaten by the poorer classes in the Orkneys.

Measurements.—Total length from tip of snout to tip of upper lobe of tail, 12 feet 11 inches ; to origin of first dorsal, 4 feet 10 inches ; posterior base of first dorsal to anterior base of second dorsal, 2 feet 6½ inches ; posterior base of second dorsal to anterior base of caudal, 1 foot 3 inches ; tip of snout to anterior base of pectoral, 3 feet 4 inches ; posterior base of pectoral to anterior base of ventral, 3 feet 4 inches ; posterior base of ventral to anterior base of anal, 1 foot 2 inches ; posterior base of anal to base of lower lobe of caudal, 1 foot 1 inch. Length of anterior edge of first dorsal, 1 foot 7 inches ; of outer edge, 1 foot 1½ inches ; of posterior edge, 5½ inches ; of base, 1 foot 1½ inches. Length of anterior edge of second dorsal, 6 inches ; of outer edge, 3½ inches ; of posterior edge, 4¼ inches ;

of base, $4\frac{1}{4}$ inches. Length of anterior edge of caudal, upper lobe, 2 feet 9 inches; of lower lobe, 1 foot 7 inches. Length of anterior edge of pectoral, 1 foot 11 inches; of outer edge, 1 foot 5 inches; of base, 8 inches. Length of anterior edge of ventral, $10\frac{1}{2}$ inches; of outer edge, 9 inches; of base, $9\frac{1}{2}$ inches; of claspers, 6 inches. Length of anterior edge of anal, $5\frac{1}{2}$ inches; of outer edge, 3 inches; of posterior edge, 4 inches; of base, $3\frac{1}{2}$ inches. Distance between first pair of gill-slits on dorsal surface, 3 inches, extending to $8\frac{1}{2}$ inches between the last pair. Length of projecting hook of snout, $1\frac{3}{4}$ inches; from tip of snout to anterior edge of eye, 11 inches; tip of snout to edge of teeth row, upper jaw, 12 inches. Circumference of snout at thickest part, half-way between eye and tip of hook, 19 inches. Girth in front of first dorsal, 3 feet 7 inches; at base of tail, 1 foot $2\frac{1}{2}$ inches. Diameter of eye—horizontal, 1 inch 4 lines; vertical, $1\frac{1}{2}$ inches. Length of nostril, 1 inch $2\frac{1}{2}$ lines; of teeth band, upper jaw 11 inches, lower jaw $10\frac{1}{2}$ inches.

I have to express my indebtedness to Mr. F. Chapman, F.R.M.S., for kindly photographing a section of the teeth row for the illustration.

RECENT PUBLICATIONS.

“GUIDE TO THE BOTANIC GARDENS, MELBOURNE.”—A handy little guide to the Melbourne Botanic Gardens has recently been issued from the Government Printing Office. Such a publication has long been wanted, as the larger “Catalogue of Plants Cultivated in the Gardens” has for many years been obsolete, and the description with plan and references in Bailliere’s “Guide to Melbourne” (1880) is probably known to few. A short history of the gardens is first given, then the visitor is taken along the principal walks of the gardens and the more interesting features pointed out, each being indexed so that it can readily be found on the accompanying plan. The naming of the lawns will also assist visitors in finding the groups of plants, but it is to be regretted that a shorter name than “Anderson-street” was not chosen for the lawn near the Yarra Bridge. Had, for instance, “Mueller” been adopted it would have recorded a name which for many years was associated with the gardens, laying the foundation of many noble plants. Thus the Guide says:—“Many of the now fine specimens in the groups of New South Wales and Queensland trees were raised from seeds obtained by the late Baron von Mueller.” A list of memorial trees planted by distinguished visitors is given, any of which can easily be found by reference to the plan. The index enumerates the principal groups and some of the more prominent individual specimens, but might have been considerably enlarged. Two plans are

given, one showing the gardens in 1873, when the present director, Mr. W. R. Guilfoyle, F.L.S., took charge, and commenced an entire remodelling of the gardens, substituting extensive lawns with small beds in them for the numerous borders and paths of Dr. Mueller's plan. Lately several important changes have been necessitated by the alteration of the course of the River Yarra. Unfortunately no scale is given on the plan, but from comparison with other maps it seems to be about 90 yards to the inch, consequently each of the squares into which it is divided will have an area of about three-quarters of an acre. The Guide, which is published at the popular price of sixpence, should prove extremely useful to visitors, and will give botanists in other countries some idea of the treasures the Melbourne Botanic Gardens contain.

JOURNAL OF AGRICULTURE, VICTORIA.—The July number (vol. i., No. 7) of this publication contains several articles of interest to naturalists. Mr. C. French, F.L.S., furnishes an article on the Horse Bot Fly, *Gastrophilus equi*, Fab., which is illustrated by a plate drawn by Mr. C. C. Brittlebank. Under the heading of "Vegetable Pathology," Mr. D. M'Alpine writes on the Brown Rot or Ripe Rot of fruit, *Monilia fruticans*, which is illustrated by a coloured plate, also drawn by Mr. Brittlebank. The first of a series of articles on the "True Grasses of Victoria" from the pen of Mr. J. G. Luehmann, F.L.S., Government Botanist, contains descriptions of seven species, with illustrations of three of them, the journal altogether forming a publication which should be useful alike to the farmer, the orchardist, and the stock-breeder.

CORRESPONDENCE.

DESCRIPTIONS OF AUSTRALIAN BIRDS' EGGS.

To the Editor of the Victorian Naturalist.

SIR,—The June number of the *Victorian Naturalist* contains an article by Mr. A. J. North, entitled "Descriptions of Some Australian Birds' Eggs," in which the eggs of seven species of birds are described, and though all of them had been previously described, no reasons are given for their re-description, nor yet references to previous descriptions. It would take up too much of your valuable space to give all the references, so I will content myself with the following:—

CHLAMYDODERA NUCHALIS, Great Bower-bird.

Le Souëf, *Ibis* (1899); Le Souëf, *Vict. Nat.*, xvi., p. 66 (1899). Type egg exhibited at F.N. Club, May, 1900.

PITTA IRIS, Rainbow Pitta.

Le Souëf, *Vict. Nat.*, xviii., p. 15 (1901). Two clutches exhibited at F.N. Club, April, 1901.

ORTYGOMETRA CINEREA, White-eyebrowed Crake.

Ramsay, Proc. Zool. Soc., p. 388 (1868), &c.

NETTOPUS PULCHELLUS, Pigmy Goose.

Gould, "Handbook Birds Australia," vol. ii., p. 357 (1865), &c.

DENDROCYGNA ARCUATA, Whistling Tree Duck.

"Anas Thein Fortflanz ges Vög.," tab. lxxxi., fig. 4 (1845-54).

Gould, "Handbook Birds Australia," vol. ii., p. 374, &c.

DENDROCYGNA EYTONI, Eyton's Tree Duck.

Ramsay, Proc. Zool. Soc., p. 346 (1877), &c.

TADORNA RADJAH, White-headed Sheldrake.

North, Proc. Lin. Soc. N.S.W., vol. ii., 2nd series, p. 446, &c.

I am, yours, &c.,

D. LE SOUËF.

THE ENGLISH DAISY A NATURALIZED PLANT.—With reference to Mr. Williamson's query on page 50 of the July *Naturalist*, as to whether the English daisy, *Bellis perennis*, had been recorded as a naturalized plant in Victoria, the following sentence occurs in a paper by Mr. C. French and myself, "A Holiday Tour in Western Victoria," published in the *Victorian Naturalist*, iv., p. 11 (May, 1887):—"Round the house the little English daisy, *Bellis perennis*, grew very plentifully, and reminded some of the party of home." The locality spoken of was at Muddy Creek, Hamilton.—F. G. A. B.

NATURE STUDY.—The Education Department has arranged with Mr. Robert Hall to deliver a series of lectures to teachers on elementary natural science at various centres round Melbourne. It is hoped by this means that, through their teachers, a greater love of nature will be fostered among the children of the metropolitan schools.

MARINE ANIMALCULES.—According to an article in the March number of the *American Naturalist*, a remarkable phenomenon was observed some little time ago on the Californian coast. A streak of "red water" was noticed some distance off the mouth of San Pedro Harbour, which subsequently broke up into a number of patches, each of several acres in extent. In the course of a few days these patches reached the shore, when the red colour was found to be due to the presence of countless myriads of animalcules belonging to the "flagellate" group. At night the sea was brilliantly phosphorescent over the red area. The most extraordinary fact connected with the visitation was the death of a large number of marine animals, including rays, sharks, and sea cucumbers, which were apparently poisoned by the animalcules. The bodies of these creatures when cast up on the beach exhaled a most pestiferous odour. At least two hundred miles of coast came under the influence of the "red water."

The Victorian Naturalist.

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No. 225.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 11th August, 1902. The president, Mr. T. S. Hall, M.A., occupied the chair, and about 35 members and visitors were present.

CORRESPONDENCE.

From His Excellency Sir George Sydenham Clarke, K.C.M.G., F.R.S., Governor of Victoria, accepting an invitation from the Club to open the conversazione on the 16th September next.

REPORTS.

A report of the excursion to Sandringham on Saturday, 19th July, was given by the leader, Mr. C. French, jun., who stated that there was a fair attendance of members. Traversing the ti-tree fringing the cliffs a number of interesting plants were found in bloom, such as *Aster ramulosus*, *Alyxia buxifolia*, *Muehlenbeckia adpressa*, *Tetragonia implexicoma*, and *Acacia suaveolens*. Among the orchids found were *Pterostylis vittata* (now getting scarce here), *P. nana*, *P. concinna*, the rare *P. precox*, var. *obtus*, *Corysanthes pruinosa*, and *Cyrtostylis reniformis*. After a diligent search in a piece of swampy ground the remarkable little fern *Ophioglossum vulgatum* was found, and later on the equally remarkable Lycopod *Phylloglossum drummondii* was secured. Several interesting scale insects, such as *Chionaspis angusta* (new to science), *Planchornia styphelia*, *Aspidiotus frenchi*, and *Lecanodiaspis acaciæ*, were collected. On the way back to the station, through the heath ground, *Epacris impressa*, *Styphelia virgata*, *Bossia cinerea*, *Pimelea octophylla*, and *Ricinocarpus pinifolius* (very early), and others were collected, altogether some forty species of plants in bloom being noted.

The hon. librarian reported the receipt of the following donations to the library:—*Journal of Agriculture of Victoria*, vol. i., parts 6, 7 (June, July), from Department of Agriculture; *Emu*, vol. ii., No. 1, July, 1902, from the Australasian Ornithologists' Union; Reprints from *New South Wales Agricultural Gazette*, by W. W. Froggatt, from the author; "Transactions Royal Society of South Australia," vol. xxv., part 1, 1902, from the Society; *Nature Notes*, June and July, 1902, from the Selborne Society, London; and *Knowledge*, June and July, 1902, from the proprietor.

PAPERS.

1. By Mr. S. A. Le Souëf, entitled "New Australian Mallophaga," part iv., communicated by Mr. D. Le Souëf, C.M.Z.S.

In this paper, which was of a purely technical character, the author described four species of Mallophaga found on the Brown Quail, Chestnut-bellied Quail, Black Swan, and Australian Spoon-bill.

2. By Mr. J. H. Gatliff, entitled "Notes on Perry's Conchology."

The author, in describing this work, which was published in London in 1811, and which seems to have been ignored or overlooked by many later writers, including Messrs. Sowerby and Reeve, drew attention to a number of Australian shells described and figured for the first time by this author, whose names, following the law of priority, take precedence over many well-known names, such as *Chione lamellata*, *Fasciolaria coronata*, &c.

The work, together with examples of many of the shells described and figured therein, was exhibited to illustrate the author's remarks.

Messrs. J. Shephard, F. Wisewould, and the President discussed the paper.

3. By Mr. F. L. Billingham, entitled "A Day on the Rubicon River, Alexandra."

The author gave an interesting description of the class of country met with in the district, and mentioned the principal birds, &c., noticed during a day's ramble, when no less than thirty-eight species of birds were identified. On a previous visit the author remarked that he had found a small specimen of the only land shell he had met with in the Alexandra district, viz., *Rhytida lampra*.

4. By Mr. D. Goudie, entitled "Notes on the Larvæ and Pupæ of Birchip Heterocera," part i.

In this paper the author gave some notes on the habits, together with a description of the larva and pupa, of *Xylorycta homoleuca*, Lower.

NATURAL HISTORY NOTES.

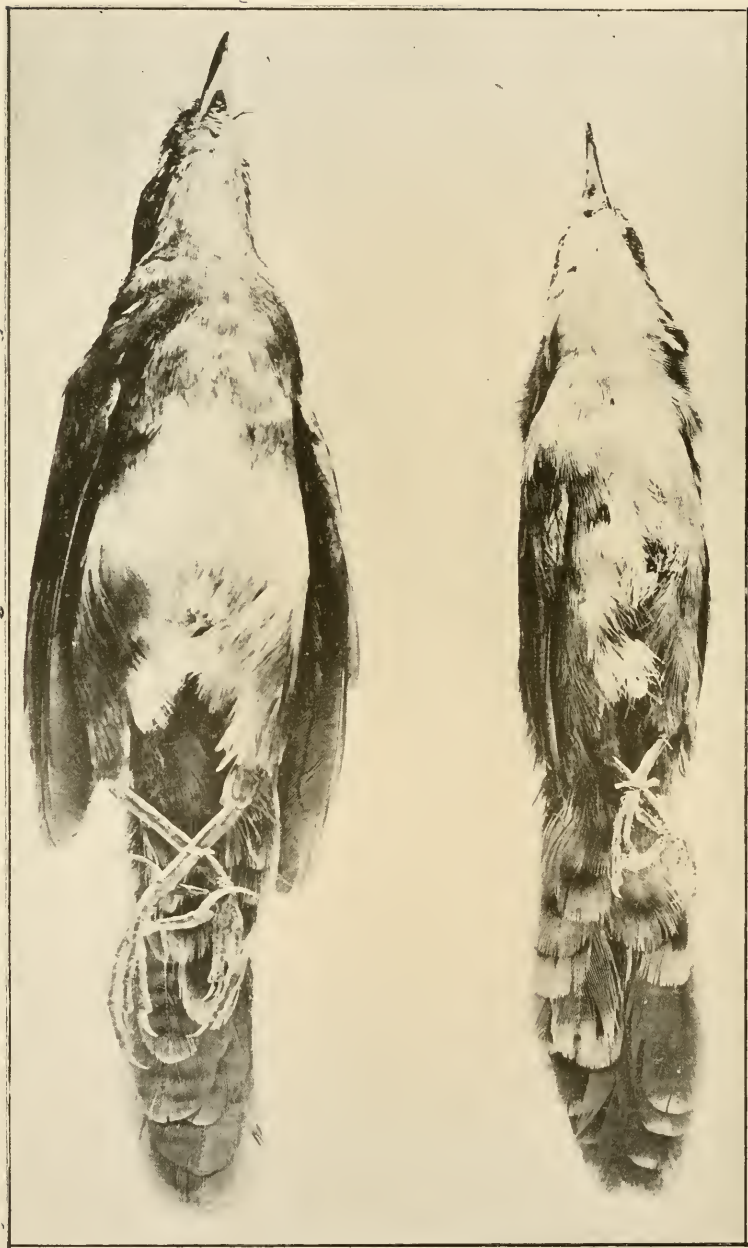
Mr. G. A. Kearnland read a note recording the occurrence of the Sanguineous Honey-eater at Bayswater.

Mr. A. J. Campbell stated that the drought was, no doubt, responsible for the appearance of these birds so far south.

Mr. G. A. Kearnland also read a note recording the fact of a Plain Wanderer having been killed by a wild Magpie near Healesville.

Mr. J. A. Kershaw, F.E.S., mentioned that a male White-capped or Shy Albatross, *Thalassogeron cautus*, was found in a dying state on Mordialloc beach on the 3rd April last.

Mr. C. Coles stated that the Delicate Owl, *Strix delicatula*, had recently been very common all round Melbourne.



SCHŒNICOLA
PLATYURA, JERDON.

(Natural size.)

EREMIORNIS
CARTERI, NORTH.

EXHIBITS.

By Mr. A. Coles.—Two specimens of the Leafy Sea-Dragon *Phyllopteryx foliatus*, from Portsea.

By Mr. C. French, jun.—New Scale Insects, *Chionaspis formosa*, from Murray River, Victoria.

By Messrs. C. French, jun., and G. A. Keartland.—Rare eggs of the following birds:—Little Flycatcher, Buff-sided Robin, White-gaped Honey-eater, and Wood Fantail; the two former of which are new to science, having been recently described by Mr. A. J. North, C.M.Z.S., of Sydney.

By Mr. J. H. Gatliff.—Perry's "Conchology," a folio volume published in 1811, also the following marine shells, in illustration of his paper:—*Lotorium (Argobuccinum) australasie*, Perry; *Murex abortiva*, Perry; *Lotorium parkinsonia*, Perry; *Lotorium rubicunda*, Perry; *Phasianotrochus carinatus*, Perry; *Fusus undulata*, Perry; *Fasciolaria australasie*, Perry; and *Chione disjecta*, Perry.

By Mr. H. E. Gatliff.—Set of eight black and white sketches drawn by an aboriginal known as King Tommy, of the Murray tribe.

By Mr. A. Mattingley.—Photo. of Iguana on a eucalypt, illustrative of the use of protective colouration.

By Mr. C. Walter.—*Atriplex angulatum*, Benth., Myrniong road, Bacchus Marsh; a new locality. Previously recorded only from the Mallee district (N.W. Victoria).

After the usual conversazione the meeting terminated.

By Mr. H. B. Williamson.—The following dried plants:—*Solivia sessilis*, Ring. and Pavon. (introduced), new record for Victoria; *Schoenus sculptus*, Boeck., Euroa, new for Victoria; *Billardiera cymosa*, F. v. M., Victoria Ranges, 1,500 feet, new for S.W. Victoria.

NOTE ON *EREMIORNIS CARTERI*.

By ALFRED J. NORTH, C.M.Z.S., Ornithologist, Australian Museum, Sydney.

(Read before the Field Naturalists' Club of Victoria, 14th July, 1902.)

SOME time ago I forwarded examples of *Eremiornis carteri* and *Platycercus macgillivrayi*—described by me in the Club's journal, *Victorian Naturalist*, xvii. (1900)—to Dr. P. L. Sclater, Secretary of the Zoological Society of London. These he exhibited at the February meeting, 1902, of the British Ornithologists' Club, and of which he has kindly forwarded me a reprint of their proceedings. Of *Eremiornis carteri* he remarks:—"Mr. North kindly sends me an example of this supposed new genus and species of Australian birds. The genus is closely allied to *Schcenicola*, of India (Cat. Birds Brit. Mus., vol. vii., p. 110), and

perhaps hardly distinct, but the specimen is not in very good condition, and I am unable to decide definitely upon it. It is at any rate a new species, and a most interesting addition to the Australian avifauna."

Before describing the genus *Eremiornis* I carefully compared the specimen on which it is founded with the characters given in the "Catalogue of Birds in the British Museum," vol. vii. (1883) of the genus *Schœnicola* and its allies, and concluded that it varied from all of them. Since then the Trustees of the Australian Museum have received two specimens of *Schœnicola platyura* from the Director of the Travandrum Museum, India, and the species upon which Jerdon founded the genus. These specimens strengthen me in my opinion that although *Schœnicola* and *Eremiornis* bear a close resemblance to each other, especially in the broad tail-feathers and the long upper and under tail coverts, they are quite distinct. In *Schœnicola* the bill is deeper and more curved at the tip, the rictal bristles stout, the primaries distinctly longer than the secondaries, the tail barely exceeding the length of the wing, the tarsi and feet long, the mid-toe when extended reaching beyond the ends of the longest under tail coverts. In *Eremiornis* the bill is straighter, the rictal bristles feeble and hardly visible, the wing more rounded and distinctly shorter than the tail, the tarsi short and feet small, the mid-toe reaching when extended about half-way down the longest under tail coverts. What I regard as constituting the chief point of distinction between the two genera is, that in *Schœnicola* the tarsi and feet are long and strong as in *Acrocephalus* and other Reed-Warblers, while *Eremiornis* has the tarsi short and the feet comparatively small, the tarsus only equalling in length that of *Smicrornis flavescens*, the smallest species of Australian birds. For the purpose of comparison the measurements of adult specimens of *Schœnicola platyura* and *Eremiornis carteri* are given below:—

	Sex.	Total length.	Wing.	Tail.	Bill.	Tarsus.
<i>Schœnicola platyura</i>	- Adult male	6.1 inches	2.6	2.8	0.46	0.8
<i>Eremiornis carteri</i>	- Adult male	5.7 inches	2.05	2.7	0.46	0.55

An accompanying photograph is exhibited here this evening of skins of the two birds of the natural size.

NOTES ON THE WHITE IBIS.

By FRANK MADDEN, M.P.

(Communicated by G. A. Kearnland.)

(Read before the Field Naturalists' Club of Victoria, 14th July, 1902.)

THE ancient Egyptians were an eminently practical people, knowing their friends and their enemies, and dealing manfully

with both. They lived in a country which was then, as now, plagued by insect pests, and their constant endeavour was to protect themselves and their crops from these marauders. We have no record of the time when they did not regard the Ibis as one of their best friends. While they did not "canonize him by the name of Jim Crow," they went as near it as they knew how in those early days. They proclaimed him "sacred," reared him in the temples with veneration, and made it a crime punishable at law to injure or destroy an Ibis, and after his death they embalmed him. They erected monuments to his honour, and on almost every mural decoration of theirs which we know the Ibis is portrayed as the companion and friend of man. They also named the bird "the father of the sickle." Unthinking persons have suggested that this was because of the slightly curved beak of the Ibis, but the Egyptians did not give a nickname for such a silly reason as that. The Ibis was named the father of the sickle because his actions in destroying insect life made the sickle necessary to cut the crops, which would not have existed if the Ibis had not held the locusts *et hoc genus omne* in check. To what state Egypt would have been reduced if the Ibis had not been protected, God only knows, but we have it on the best authority that in spite of bad seasons there still "was corn in Egypt." I write this introduction merely to show that the value of the Ibis to the farmer is no new discovery, and that as we occupy a country infested with similar insect plagues to those in Egypt, and are blessed with the same means of combating them, we should do everything in our power to protect these sacred birds and encourage them to increase and multiply. I do not purpose to write of the Ibis from a scientific point of view, but merely to draw attention to the bird as an active and constant friend to the farmer, the grazier, and the gardener.

Other insectivorous birds, from the Bustard to the Blue Wren, feed on insects all the year round, but the insects increase in spite of them until a visitation of Ibis takes place. When the Ibis come in numbers to a district they remain until they have completely cleaned off all insect life which they can reach, and so that district is allowed to bear crops for several years free, or almost free, from the depredations of local insects. Of course the locust, which comes from a distance, may cause damage, but the cricket, the take-all, the harvest caterpillar, and other dire enemies of the farmer will not be noticed. Those of us who have observed the methods of the Ibis, know how thoroughly they work a district so as to be sure they have completed their mission and devoured all there is for them to eat. Watch a flock of Ibis on an autumn day on ground which is cracked by the heat of the previous summer, and where the crickets have effected a lodgment. Before the birds come the land is alive with these

ravenous insects. When a flock of Ibis arrive they settle on one spot and pick, and pick, and pick by the hour. Then the crickets which have so far escaped become frightened, and disappear beyond the reach of the Ibis into the cracks in the ground, and the Ibis rise and seek a fresh place and commence operations there. When the crickets left in the first patch find that the birds are gone, they come out to graze, as they are as ravenous for grass as the Ibis are for crickets; and this the birds well know, and when they have reduced the second point of attack to the same condition as the first was in when they left it, they return to the first, and remain while a single cricket remains above ground, and so from place to place. I have noticed that the birds leave longer and longer intervals between their visits to any one spot, and the oftener they return the shorter time they remain, proving that they only come and stay so long as there is insect food to be had. Examine a place where locusts have deposited their eggs after it has been visited by a flock of Ibis, and you will find the ground as full of holes as a cullender. These holes are made by the powerful beak of the Ibis being driven into the ground to reach the eggs or newly hatched insects, and the millions of the pest they thus destroy can only be imagined.

Farmers will doubtless remember the benefits they have received in the shape of heavy crops after the Ibis have stayed a season with them, and some farmers have the good sense to protect the birds. In the year 1890 the harvest caterpillar was extremely bad in the Western District of Victoria. Crops had to be cut before they were ripe to save anything from this pest, and a great deal of fodder was spoiled in the stooks by the excreta of the insects which remained in the crop after it was cut. I remember a most lovely crop of malting barley, which was grown close to the railway station at Camperdown. I saw it just as it was becoming fit to cut, and admired it greatly. Three days afterwards there was hardly a grain of corn to be seen of it. The caterpillars had cut off all the heads, and the farmer had to turn his stock in to eat the fallen grain. That autumn the Ibis came not in battalions or regiments, but in whole army corps, and stayed during the winter, and for three years afterwards hardly a single harvest caterpillar was to be seen.

If kept in gardens as pets these birds do infinite service in keeping down injurious insects. Permits to keep them for that purpose may be had from Mr. Martin, the Secretary for Public Works, in whose hands the administration of the *Game Act* rests.

The chief difficulty in keeping Ibis in a semi-wild state is that foxes prey upon them whenever they get an opportunity, and a pinioned Ibis has no chance against Reynard.

NOTES ON PERRY'S "CONCHOLOGY."

BY J. H. GATLIFF.

(Read before the Field Naturalists' Club of Victoria, 11th Aug., 1902.)

PERRY'S "Conchology" is a folio volume, with a short preface, published in London in 1811, and contains 51 coloured plates, comprising 338 figures. Opposite each plate is letterpress, with brief description of the shell, followed at the bottom of the page by remarks; the pages are not numbered, and the figures are, in most instances, enlarged.

Having recently obtained a copy of this work from London, as some of our shells are there named, figured, and described, and such descriptions and names have since been generally ignored, I will set forth some of the facts worthy of adequate recognition.

Taking what may be, perhaps, considered the best known genus, *Cypræa*, Perry is the first to figure and name one of the rarest, and, I think, the most beautiful shell in the genus. I refer to *Cypræa valentia*; it is about the size of what is commonly known as the Tiger Cowry, and was subsequently named *Cypræa princeps* by Gray in 1824. Cosmo Melvill, in his "Survey of the Genus *Cypræa*," published in 1888, says there are only six specimens of this rare species known, one of which is in the fine collection of Dr. J. C. Cox, of Sydney, who afforded me the pleasure of examining it. Melvill, in his work, states in a footnote:—"Mr. George Perry, in 1811, published a large folio volume, in which many shells were delineated and described for the first time. Unfortunately he does not appear to have taken the trouble to consult previous authors, hence his writings abound with duplicate names, glaring errors, descriptions of young shells as separate species, and the like. He has fallen under the lash of subsequent writers, especially Messrs. Sowerby and Reeve, who ignore all his descriptions, but in justice to him and to the law of priority, where his species can be deciphered, many of the paintings being very fanciful, it is only right to attach his names—*C. princeps*, Gray, *nebulosa*, Kien., *turdus*, Lamarck, and *melanostoma*, Leaches, thus become *valentia*, *surinamensis*, *ovata*, and *camelopardalis* (all of Perry)." I am doubtful as to whether *C. surinamensis* = *C. nebulosa*, as the latter has many more teeth than are depicted in Perry's figure. Tryon and Melvill both fall into error in stating *C. misella*, Perry = *C. ziczac*, L., and *C. gemmosa*, Perry = *C. nucleus*, L., whereas the reverse is the fact; *C. misella* = *C. nucleus*, and *C. gemmosa* = *C. ziczac*.

Although Messrs. Sowerby and Reeve seem to have ignored Mr. Perry's work when they followed on a generation or more later, it would have been more advisable if they had given credit for those portions of it in which he for the first time figures and very briefly describes certain shells, and when such work becomes known to later workers it must have due value given to it. When

he is found re-naming species of Linnæus, such as *Cypræa mappa*, some of which should have been well known to a conchologist, perhaps it is only to be expected of human nature that his work should be treated by some of his successors in a similar manner. In his figures giving a side view of the shell of *Cypræa*, for instance, he has also attempted to give a partial delineation of the base, which, until his aim is understood, gives a most erroneous impression of its natural appearance; and his extremely meagre and unscientific description would be useless if he had not figured the species. It therefore follows that when the figures are past recognition the work is useless so far as it relates to them; but other figures are most excellent.

I will now only briefly refer to some of the shells found in Australian waters where his name for the species is entitled to rank prior to the name which has hitherto been generally accepted, thus:—

Biplex australasia, pl. 4, ff. 2 and 4 = *Lotorium* (*Argobuccinum*) *leucostoma*, Lam. 1822.

Triplex frondosa, pl. 6, f. 1.

Triplex abortiva, pl. 6, f. 5.

Triplex denudata, pl. 7, f. 2.

These three represent merely varieties in form of one species—viz., *Murex australis*, Quoy and Gaimard, 1833. Mr. Brazier, in Proc. Lin. Soc. N.S.W., vol. viii., p. 113, arrives at the same conclusion respecting fig. 1, pl. 6, but wrongly quotes it as *T. ponderosa*; and again in Part iii. Aust. Mus. Cat., No. 15, at p. 60, he quotes it as *T. pondosa*. The name *frondosus* having been already used by Lamarck in 1803 for a fossil *Murex*, Perry's second name of *abortiva* should become that of the species.

Septa parkinsonia, pl. 14, f. 1 = *Lotorium fusiformis*, Kiener. 1842 (?).

Septa rubicunda, pl. 14, f. 4 = *Lotorium australis*, Lam. 1839.

Bulimus carinatus, pl. 30, f. 1; *Bulimus eximius*, pl. 30, f. 2. Two varieties of the same shell and = *Phasianotrochus rosea*, Lam. 1822.

Pyrula undulata, pl. 54, f. 1 = *Fusus pyrulatus*, Reeve. 1847.

Pyrula australasia, pl. 54, f. 4 = *Fasciolaria coronata*, Lam. 1822.

Venus disjecta, pl. 58, f. 3 = *Chione lamellata*, Lam. 1818.

P.S.—The foregoing paper was read on 11th August. I have since received the "Proceedings of the Linnean Society of New South Wales," 1902, part 1, issued on 22nd August, containing an article by Mr. C. Hedley, Conchologist, Australian Museum, Sydney, entitled "Studies on Australian Mollusca," part 6, in which he refers to the same work, and it is noticeable that his conclusions, arrived at quite independently of mine, are, on the points included in both papers, almost identical.—J. H. G.

A DAY UP THE RUBICON RIVER.

By F. L. BILLINGHURST.

(Read before the Field Naturalists' Club of Victoria, 11th August, 1902.)

To most minds the name of the Rubicon River is associated with a crossing; but when, where, or how probably few know or care. They merely know that to "cross the Rubicon" means to enter on some enterprise from which there is no turning back, as did the ancient Cæsar when he crossed the original river of that name, which divided Italy from Cisalpine Gaul. I am not aware what kind of a river that was, or is, but we in Alexandra associate the name with a lovely little swift-flowing mountain stream, emptying itself into the Goulburn not many miles from the town, a favourite place for picnics, where on a warm summer's day one can lie in the shade of the tree ferns, or the lightwood trees, listening to the babbling of the cool water, and watching, it may be, a fine fat trout under the banks—for there are trout in the stream, and good ones, too. A river to delight the heart of the naturalist, where the beautiful white and green *Papilio macleayanus* may be seen by the dozen, with *Ialmenus*, *Epinephile abeona*, and numerous other Lepidoptera of various families and genera; where big brown *Cetonia* beetles buzz past in a terrible hurry, and huge Dragon-flies unknown to science float in the air, or dart rapidly hither and thither after the gnats and other small fry which form their daily bread; a river where you can fill your collecting box or bottle, as the case may be, without undue exertion, and then have time to revel in the ferns and the cold water—cold on the hottest summer's day—and go home with a sensation that you have lived for one day at least.

Feeling rather cobwebby last week, I thought a tramp up the Rubicon, with or without the proverbial crossing, would do me good, so got on my horse one morning, and a smart ride of ten miles or so brought me well up the river, where, leaving my nag at a friendly farm, I proceeded to enjoy the beauties of nature as only a naturalist can. Being the month of May, insect life was conspicuous by its absence, so I did not trouble myself about it. But the birds!—there are always birds about—therefore I looked at the birds, and admired them, and took particular note of the various kinds I saw, and jotted them down in my memory, and then I thought it might interest some of the bird-loving members of the Field Naturalists' Club to know what sort of birds may be seen up the Rubicon River on a sunny day in May, hence all this prologue and its suite.

My friend the farmer knows my proclivities, and informed me before I left him that there was "a powerful lot of Satin-birds about lately." This is the local name for the Satin Bower-bird, *Ptilonorhynchus violaceus*, and I had not gone far before I struck

a flock of them. There must have been pretty well a hundred, and the sun glinting on their plumage had a beautiful effect as they flew from tree to tree. I only saw three black ones. The scrub along the river was full of small birds. Little flocks of Blue Wrens, *Malurus cyaneus*, and Red-browed Finches, *Egitha temporalis*, hopped in and out of the bramble clumps; *Acanthiza lineata* and *A. pusilla* were plentiful; Robins, Yellow-breasted, *Eopsaltria australis*, Flame-breasted, *Petroeca phoenicia*, and Scarlet-breasted, *P. leggii*, the Grey Shrike-Thrush, *Collyriocincla harmonica*, White-shafted Fantail, *Rhipidura albiscapa*, Black Fantail, *Sauloprocta motacilloides*, a single specimen of the Mountain-Thrush, *Geocichla lunulata*, Yellow-rumped Tit, *Acanthiza chrysorrhoa*, White-throated Thickhead, *Pachycephala gutturalis*, White-throated Tree-creeper *Climacteris leucophaea*, White-browed Scrub-Wren, *Sericornis frontalis*. All these birds were noted—common little fellows, but helping to make the scrub lively. Twice I was startled by a loud whirring close at hand, the cause being a fine Wonga Pigeon, *Leucosarcia picata*, which in each case merely flew up into an adjacent wattle tree, and allowed me to approach right up to the tree without moving. Twice also I heard the note of the Lyre-bird, *Menura superba*. On more than one occasion previously, when accompanied by dogs, they have put up these birds, but, having no dogs this time, I did not get a sight of them.

Emerging from the scrub sometimes, and walking along the sides of the hills, a different class of birds was seen. Sulphur-crested Cockatoos, *Cacatua galerita*, irritated with their harsh scream; one flock of five Gang-Gang Cockatoos, *Callocephalon galeatum*, flew across. Occasionally the mournful note of the Chough, *Corcorax melanorhamphus*, drew attention to a small flock of a dozen or so. Red Lories, *Platycerus pennantii*, in all stages of plumage, and Rosellas, *P. eximius*, chattered in the gum trees, some of the former very gorgeous in their crimson and blue. The Black-backed Magpie, *Gymnorhina tibicen*, and the Laughing Jackass, *Dacelo gigas*, were common. The only Honey-eaters noticed were the Wattle-Bird, *Acanthochaera carunculata*, and the Minah, *Manorhina garrula*. A few Brown Tree-creepers, *Climacteris scandens*, were seen, also two Grey Magpies *Strepera cuneicaudata*, and an occasional Crow, *Corvus coronoides*.

One thing I noticed was that the higher I got into the mountains the scarcer the birds became, until at last they seemed to disappear altogether, so after some lunch and a rest I turned back and retraced my steps to the farm where I had left my horse.

Mammals are rather scarce in these districts, and the only specimen I saw was a Ring-tailed Opossum, which I shook out of

its nest in a sapling ; but I noted tracks of both Kangaroo and Wallaby, and any number of Wombat holes. On one occasion when I was up this river with a little fox terrier he disappeared into one of these holes—one might almost term them tunnels—and I could hear him and the Wombat arguing matters in no uncertain tones. I tried to call him out, but without success, and, supposing he could not hear me, got head foremost into the tunnel, and eventually succeeded in calling him off. I only mention this incident because I lit a match before I got into the hole, and crawling up the side I found a small specimen of *Rhytida lampra*, the only land snail I have seen in the Alexandra district.

During my ride home I noted the following birds in addition to those already mentioned, mostly on the lagoons which intersect the Goulburn flats :—Blue Crane, *Ardea novæ-hollandiæ*, Spur-wing Plover, *Lobivanellus lobatus*, Black Duck, *Anas superciliosa*, Bald-Coot, *Porphyrio melanonotus*, Straw-necked Ibis, *Geronticus spinicollis*, Spoonbill, *Platalea flavipes*, Magpie Lark, *Grallina picata*, and a Hawk I could not identify. This makes a list of thirty-eight birds noted in one day's walk, which I suppose is a fair average for a district.

NOTES ON THE LARVÆ AND PUPÆ OF BIRCHIP HETEROCERA.

PART I.

By D. GOUDIE.

(Read before the Field Naturalists' Club of Victoria, 11th Aug., 1902.)

XYLORYCTA HOMOLEUCA, Lower.—This insect, though somewhat local, would appear to have a wide range, being found not only in the Mallee, but in North Queensland. The caterpillars bore into the twigs of the Needlewood, *Hakea leucoptera*, to the depth of about $1\frac{1}{2}$ inches, and fastening the mouth of their habitation with web and refuse, devour at their leisure the leaves they convey there during the night. They attack young and stunted trees in preference to old ones, and generally choose a fork in which to make their abode. When about to change they spin a very hard yellow wad across the entrance of their tunnel, and it can thus be seen when to take them. The moths emerge in November. The following descriptions of the larva and pupa may be of use to collectors :—

Young Larva.—Head dark brown. First segment dark, shining red. Prominent. Ground colour of body slaty-grey, darker in the full-grown caterpillar. Dorsal line dark grey ; this, however, appears to come and go with the respiration of the larva. On each side of this there is a row of polished black

streaks, broadening into spots near the anal segment, which is dark grey without markings. Lateral area with three rows of small black specks, with violet-pink markings between. These are very variable, however, and sometimes are altogether wanting. Head and body covered thinly with a few fine hairs. Feet red, darker in full-grown specimens.

Pupa.—Length, from $\frac{1}{2}$ to $\frac{7}{8}$ of an inch. Narrow. Light brown when freshly changed, but soon becoming darker. Head dark brown or black; not pronged like *X. cryptophaga*. As the time for emerging draws near the whole pupa, with the exception of the wing-cases, turns nearly black, and this, contrasted with the shining white wings inside, gives it quite a handsome appearance. The moths generally emerge during the night.

PLAIN WANDERER.—On 26th July Mr. F. Syme, of Dalry, Healesville, forwarded me a male Plain Wanderer, *Pedionomus torquatus*, which was killed by a wild Magpie on his estate. I found on skinning the bird that its skull was broken by a single snap of the powerful mandibles of the Crow-Shrike (Magpie).—G. A. KEARTLAND.

PRISM BINOCULARS.—We have received from Messrs. Ross Limited, the well-known opticians of London, a report, in pamphlet form, by Mr. Charles Dixon, a leading English ornithological author, on "The Advantages, Possibilities, and Uses of the Ross Prism Binocular, as applied to Field Natural History." In this little work of some twenty pages Mr. Dixon points out how much more interesting it is to take a glass out into the country and watch and note down what one can observe in the habits of birds, or even of insects, rather than use a gun to bring down the object of your investigation, and thus perhaps end a useful life. To show the superiority of the new glass over one of the highest class binoculars, which he had used for years and did not think could be beaten, he states that a number of rabbits amongst short grass and dead bracken, at a distance of four hundred yards, quite indistinguishable to the human eye, through his old glass appeared as round objects of some kind, but with the prism binocular they came out in the clearest detail, the exact attitude each was sitting or lying in being clearly shown, while at forty measured yards the pupil of a rabbit's eye was brought out with beautiful clearness. The glass is manufactured by Messrs. Ross in three powers, 8, 10, or 12 diameters of magnification, and ranges from £8 10s. to £10 10s. in price. The pamphlet is worth obtaining by anyone interested in this branch of natural history work, and will be forwarded on receipt of sixpence in stamps by Messrs. Ross Limited, 111 New Bond-street W., London.

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 8th September, 1902. The president, Mr. T. S. Hall, M.A., occupied the chair, and about 50 members and visitors were present.

CORRESPONDENCE.

A letter was read from Mr. W. J. Crisfield, North Carlton, regarding the poisoning of rabbits, in which the writer referred to the differences of opinion existing as to the young rabbits taking the poison, and suggesting that a conference of farmers and landholders be held with a view to obtaining a decided opinion on the matter.

After a short discussion, it was not deemed necessary for the Club to take any action, and the matter was allowed to drop.

REPORTS.

Mr. G. Coghill, who acted as leader on the Club's excursion to Greensborough on Saturday, 23rd August, in place of Mr. F. G. A. Barnard, who was unable to attend, reported that over twenty members and friends attended, some of whom decided to go on to Eltham. The Silver Wattles, *Acacia dealbata*, along the Plenty River were in full bloom, presenting a beautiful sight, and well repaid the visit. Wild flowers were, however, very scarce, not more than ten or twelve species being seen altogether during the afternoon.

Mr. R. Hall reported that about seven members attended the excursion to Dandenong Creek (*vid* Mitcham) on Saturday, 6th September. Birds were, however, not very plentiful. Crows, which are usually found on the western side of Melbourne, were seen and heard, while the sub-species of *Pardalotus ornatus* was identified with the aid of field-glasses. Of wild flowers some twenty-four species were met with, among which the following—*Hovea heterophylla*, *Acacia suaveolens*, *A. myrtifolia*, *Diuris maculata*—taken from a list supplied by Dr. C. S. Sutton and Mr. A. D. Hardy, may be mentioned.

The hon. librarian reported the receipt of the following donations to the library:—*Journal of Agriculture of Victoria*, vol. i., part 8, August, 1902, from Department of Agriculture; "Proceedings of Royal Society of Victoria," vol. xv. (new series), part 1, from the society; *The Wombat*, vol. v., No. 3, from the

Geelong Field Naturalists' Club; "Records of the Mining and Geological Museum, Sydney," vol. vii., part 2, and "Handbook of Mining and Geological Museum, Sydney," from Department of Mines, New South Wales; "Records of Australian Museum, Sydney," vol. iv., part 7, from the Trustees; "Proceedings of Linnean Society of New South Wales," vol. xxvii., part i., from the Society; *Nature Notes*, August, 1902, from the Selborne Society, London; and *Bulletin American Museum of Natural History*, vol. xvii., part 2, from the Museum.

ELECTION.

On a ballot being taken Dr. George Horne, M.D., Mrs. George Horne, and Miss Bowie, of Clifton Hill, and Dr. F. H. Cole, M.B., Rathdown-street, Carlton, were unanimously elected members of the Club.

PAPERS.

By Miss G. Sweet, M.Sc. (communicated by G. Sweet, F.G.S.), entitled "Mosquitos and Disease."

The author described the main features of the principal genera of mosquitos, and then pointed out how certain diseases had been traced to the infection carried to healthy individuals by mosquitos from persons already attacked, and said that it is probable other diseases will be found to have been spread by similar means.

In the discussion which ensued, in which Miss Sweet was complimented on the interesting nature of her paper, Mr. D. Le Souëf, C.M.Z.S., mentioned the practice adopted by residents in Queensland in allowing swallows to build their nests about their houses for the purpose of encouraging them to remain in the district and so help to keep down the numbers of mosquitos.

Mr. G. A. Keartland stated that a very small species was very plentiful in North-Western Australia, which frequently causes blindness in the horses and camels, unless the precaution is taken of rubbing the animals with castor oil.

Mr. J. Shephard instanced a water tank in which the water was sometimes nearly boiling, but in which the larvæ of mosquitos flourished.

Mr. A. D. Hardy stated that he had lived for some months in the Niger Coast Protectorate (now Southern Nigeria), West Africa, a country rendered almost uninhabitable for the white man by fever, and mentioned that it was from Major Ross, who represented the School of Tropical Medicine, Liverpool, that many had first heard that mosquitos, and more particularly the genus *Anopheles*, were responsible for the transference of the fever germ, and that the genus *Culex* was innocent of the evil. Prior to this being made known it had been noticed that when

the opening of trenches or other excavations in marshy tracts was in progress there was almost invariably an attack of fever among the white men superintending the work, which was supposed to be due to the freeing of gases from decomposing vegetation. Regarding the suggestion that eucalyptus trees tended to keep away mosquitos he instanced a bungalow in the Niger country which was particularly noticeable for the prevalence of mosquitos, notwithstanding that two eucalypts, *E. citriodora*, were growing close by the door.

Mr. T. S. Hall, M.A., drew attention to the valuable work recently published by Mr. F. V. Theobald on this subject, and remarked at the same time on the very limited extent of our knowledge of this group in Victoria.

NATURAL HISTORY NOTE.

The hon. secretary read an extract from a letter from Mr. M'Bain, of Point Lonsdale, to Mr. S. A. Le Souëf with reference to the spawning of the Murray Cod, *Oligorus macquariensis*, in which the writer gave it as his experience that the fish spawns about November, when the river, owing to the melting of the snow, is at its highest, and spreads over the flats along its banks, sometimes for miles. Though he had not seen the ova he believes the fish spawn in hollow burnt logs on the flats, where the water is warm, having frequently disturbed the fish in such places, and afterwards seen young fry not more than a quarter of an inch long swimming about in the holes. Directly the water commences to recede the young fry depart and are next found in the main streams in places where there are eddies, and the banks fringed with weeds and long, thin grass; here they are about an inch long, and if not disturbed will remain in the locality until the next season, when they will be about 4 inches in length.

EXHIBITS.

By Mr. A. Coles.—A specimen of the Diving Petrel, *Pelecanoides urinatrix*, captured on board a steamship in Bass Strait.

By Miss S. W. L. Cochrane.—Painting of wattles in bloom at Greensborough.

By Mr. C. French, jun.—Cocoons, pupæ, and perfect insects, male and female, of the Bee Moths (*Galleria*); also samples of honeycomb destroyed by these moths.

By Mr. H. J. Grayson.—Beck's "London microscope" stand, No. 1,129, K., with the following note:—"Members interested in microscopical matters will observe that this microscope, though small, is equipped for a considerable range of work, being furnished with objectives possessing excellent corrections. The instrument is well made, extremely compact, and probably lower in price than any other microscope of the same capacity hitherto

obtainable." Also a series photo-micrographs, taken with a 1-inch Beck orthostigmat-photographic lens.

By Mr. D. Le Souëf, C.M.Z.S.—Flame-breasted Robin with unusual colouration of breast.

After the usual conversazione the meeting terminated.

FIELD NATURALISTS' CLUB CONVERSAZIONE.

THE fourteenth conversazione of the Field Naturalists' Club of Victoria was held at the Athenæum Hall, Collins-street, on Tuesday and Wednesday, 23rd and 24th September, 1902.

It was expected that His Excellency Sir George S. Clarke, K.C.M.G., F.R.S., Governor of Victoria, would have opened the proceedings on Tuesday evening, but at the last moment wrote regretting his inability to be present. The letter, however, went astray, and the non-arrival of His Excellency caused considerable disappointment. The president, Mr. T. S. Hall, M.A., therefore undertook the duty of declaring the conversazione open, which he did in a few brief sentences.

There was a large attendance of members and of the general public, and the display of objects was equal to if not better than any previous effort of the Club, and those who had not previously attended one of the Club's conversaciones were greatly pleased with the wealth of interesting natural history objects on view.

A feature of additional interest in this year's display was the introduction of exhibits of wild flowers, which, considering that it was somewhat early in the season for the majority of our plants, was very creditable, and spoke well for the enthusiasm of the exhibitors, who had travelled many miles and braved some unpleasant weather to secure the specimens. Through the kindness of Mr. C. Walter most of the flowers were labelled with their scientific names, while it may be mentioned that Mr. G. Coghill's collection of some 150 species from Bairnsdale, &c., was arranged in systematic order according to the "Key to Victorian Plants," in addition to which he exhibited some 40 species of flowers from the Mallee.

Among the many interesting exhibits it may be invidious to make distinctions, but Mr. G. Lyell's exhibit of an almost complete series of Australian Lycanid (blue) butterflies deserves special notice, while Mr. R. Hall's case illustrating special features in certain species of birds, such as "recognition marks," "protective colouring," "power of flight," "sexual colouration," &c., seemed to appeal directly to the most uninterested visitor.

On Wednesday afternoon Mr. D. Le. Souëf, C.M.Z.S., gave an interesting lecturette, entitled "The Protective Colouration of Birds, their Eggs and Nests," in which he showed why in many families of birds the male did all the sitting instead of the female ;

why plovers and similar birds laid dark-coloured eggs on dark-coloured, damp soil, while, excepting pigeons', white eggs were laid in hollows of trees; the wonderful way in which many birds built their nests to escape observation; how many birds remain perfectly still when a hawk passes over; also, why certain birds had their protective colouration on the back, while others had it on the breast. The lecturer was followed with great interest, and his remarks were illustrated by numerous lantern slides.

In the evening Professor Baldwin Spencer, M.A., F.R.S., gave an interesting lecture entitled "Scenes in Central Australia," in which he explained, by means of a fine series of lantern slides, the different types of country to be met with in the centre of the continent, and graphically illustrated the difficulties which beset the explorer in that region.

The Club was again indebted to Mr. J. Searle for placing his lantern at its disposal, so that the lectures might be suitably illustrated.

A fine display of objects under microscopes was made by members who take up that method of studying nature, and some twenty instruments were fully occupied during the whole time of the conversazione.

A number of specimen plants for platform decoration were kindly lent by Mr. R. Cheeseman, of North Brighton, while Messrs. Watson and Sons had an interesting exhibit of the latest improvements in microscopes, choice mounted microscopic objects, spirit specimens showing the metamorphoses of reptiles, &c., and collecting materials.

EXHIBITS.

The following is a list of the exhibitors, with particulars of their principal specimens:—

ANDERSON, E., Toorak—British and Victorian Lepidoptera. Living Larvæ of Victorian Moths. Drawings of Larvæ of Victorian Moths.

BEST, D., Hawthorn—Five cabinet drawers of Australian Beetles (Coleoptera). One drawer of Australian Wasps, Hornets, &c. (Hymenoptera). One drawer of Victorian Butterflies.

CAMPBELL, A. G., Armadale—Bird Architecture and Live Opossum.

CHAPMAN, F., A.L.S.—Collection of Foraminiferal Limestone from Egypt, Sinai, and India. Collection of British Fossils.

COCHRANE, Miss S. W. L., Melbourne—Paintings of Wattle Blossom, &c.

COLES, A., Melbourne—Kangaroo, Emu and young, Pair of Wedge-tailed Eagles, Black Eagle, English Badger, Platypus, Group of Entellus Monkeys, White-faced Monkey, Giant Penguin, case of Royal Spoonbills, New Zealand Huia, case of Grass-Finches, covey of Brown Quail, covey of Stubble Quail, case of Golden Plover, Snowy Owl, Schnapper, King Schnapper, Murray Perch, Spotted Ling, Parrot Fish, Pike, Yellow-tail, Red Mullet, Bream, John Dorey, and Blackfish.

DEPARTMENT OF AGRICULTURE, Entomological Branch—Five cabinet drawers of Life-Histories of Insects. One drawer of Scale Insects (Coccidæ).

- DRAYTON, S., Brighton—Live Gallinule (Moor-Hen), caught on board ship 1,000 miles off Brazilian coast.
- FRENCH, C., F.L.S., Malvern—Four cabinet drawers of Australian Lepidoptera. Four drawers of Foreign Lepidoptera. One framed drawing of Australian Longicorn Beetles.
- FRENCH, C., jun., Richmond—Collection of Victorian Aboriginal Stone Implements—viz., Tomahawks, Adzes, Pounding, Grinding, and Sharpening Stones, &c.
- FRENCH, Mrs. C., jun., Richmond—Collection of Spondylus Shells.
- GABRIEL, J., Abbotsford—Collection of Australian Birds' Eggs.
- GABRIEL, C. J., Abbotsford—Collection of Marine Shells.
- GATLIFF, J. H., Carlton—Two cases Marine Shells (family Olividae).
- GATLIFF, E. H., Carlton—Specimens of Kaffir Native Work.
- HAASE, J. F., Melbourne—Four cases of Australian Lepidoptera (Butterflies) and Live Larvæ of Victorian Moths.
- HALL, T. S., M.A., Carlton—Collection of Geological Specimens.
- HALL, R., Box Hill—Australian Bird Skins, showing particular features.
- JARVIS, E., Richmond—One case showing external anatomy of a Beetle. One case showing external anatomy of a Butterfly.
- KEARTLAND, G. A., Preston—Collection of Birds' Skins, Eggs, Live Birds, and Native Weapons.
- KERSIAW, J. A., F.E.S., Windsor—Six cabinet drawers of Australian Lepidoptera (Butterflies and Moths). Two drawers of Australian Lepidoptera with their Larvæ, &c. Live Larvæ of Victorian Lepidoptera (Moths).
- KITSON, A. E., F.G.S., Melbourne—Native Bread from Moyarra, near Jumbunna.
- LE SOUEF, D., C.M.Z.S., Parkville—Magpie's Nest (made principally of wire). Young Platypus in spirits. Young Grey Kangaroo (from pouch). Carapace of Hawk-bill Turtle. Snakes in spirits, Eggs of Carpet and Black Snakes, Cast Snake Skin. Dugong Tusks, Queensland Shells, Queensland Bean in Pod, White Ants' Nest, Green Ants' Nest, Hornets' and Wasps' Nests, Vegetable Caterpillar, Devil Lizard, &c. Live Carpet Snake, Blue-tongue Lizards, Stump-tail Lizards, Gould's Monitor, &c.
- LYELL, GEO., jun., Gisborne—Three cabinet drawers of Australian Blues (Butterflies), 77 species.
- MATTINGLEY, A., North Melbourne, and CUMMINS, R. H., B. Sc., Adelaide—Australian Echinoids (Starfish and Sea Urchins).
- PITCHER, F., Brighton—Collection of Australian Ferns (dried).
- PRITCHARD, G. B., Moonee Ponds—Collection of specimens showing the preservation of Fossils.
- SHEPHERD, G. E.—Australian Birds, mounted.
- SMART, H. C., Camberwell South—One case of Victorian Birds' Skins.
- SPRY, F. P., South Melbourne—Three cases of Australian Lepidoptera (Butterflies).
- SWEET, G., F.G.S., Brunswick—Collection of Australian Geological Specimens.
- THIELE, E. O., Melbourne—One case of Tasmanian Marine Shells.
- TOWNSEND, S. P., Mornington—Australian Birds, mounted.
- WALTER, C., Melbourne—Botanical Specimens collected by Dr. Ludwig Leichardt in 1843.
- WEINDOKFER, G., Melbourne—Algæ, collected during the Club's Camp-out at Shoreham (Western Port), 28th March to 1st April, 1902. Plants collected during the Club's Excursions to Sandringham and Lilydale.
- MICROSCOPIC SECTION.—Microscopic exhibits were made by—
Miss Bainbridge, pond life.
Mr. R. A. Bastow, mosses.

MICROSCOPIC SECTION—*continued.*

- Mr. F. Chapman, A.L.S., recent foraminifera.
 Rev. W. Fielder, F.R.M.S., development of an eye.
 Mr. J. Gabriel, pond life.
 Mr. A. D. Hardy, pond life.
 Mr. J. F. Haase, entomostraca.
 Mr. C. Hallam, pond life.
 Mr. W. J. M'Caw, biological preparations.
 Mr. J. Shephard, pond life.
 Mr. J. Stickland, pond life.
 Mr. W. Stickland, pond life.
 Messrs. W. Watson and Sons, various choice mounted objects.

WILD FLOWERS.—Exhibits were made by—

- Miss Bainbridge.
 Miss S. W. L. Cochrane, from Beaumaris.
 Mr. Geo. Coghill, from Quambatook and Ultima (Mallee district), Mansfield, Bayswater, Beaumaris, and Bairnsdale.
 Messrs. C. French, jun., C. Walter, and G. Weindorfer, from Dandenong Ranges.
 Mr. C. M. Maplestone, from Eltham.
 Mr. J. T. Paul, from Grantville.
 Mr. W. Scott, from New South Wales.
 Dr. C. S. Sutton.
 Miss G. Wisewould, from Gembrook.

MOSQUITOS AND DISEASE.

BY GEORGINA SWEET, M.Sc.

(Communicated by G. Sweet, F.G.S.)

(Read before the Field Naturalists' Club of Victoria, 8th Sept., 1902.)

[ABSTRACT.]

THE increasing evidence of the connection between mosquitos and many blood diseases renders the study of these pests both necessary and interesting. Further, a knowledge of their habits, their life-histories, the invariable relations of some forms with such diseases, and of the numerous side issues therefrom, is rendered now much more readily obtainable since the long labours of many working in tropical and sub-tropical regions, some of whom have lost their lives in the investigation. I am greatly indebted for information derived from the works of Mr. F. V. Theobald, Dr. P. Manson, and Dr. T. O. Howard, also Dr. Nuttall, and others.

The general external features of these six-footed, two-winged "flies" are well known—the head with sensory appendages, thorax with walking appendages and wings, and the abdomen; the piercing and sucking mouth and proboscis, through which passes out the poison which assists the suction of the food, the great variety of scale structure, and the conspicuous venation of the wing, are characteristic structures.

The main genera so far known to be connected with disease are—*Anopheles* with malaria, *Culex* with filariasis, and *Stegomyia*

with yellow fever. In the life-history of the two former are numerous differences in detail, *Stegomyia* being more closely allied to *Culex*, of which genus it was until recently a member.

The ova of *Culex* are generally laid in concave boat-shaped masses on artificial collections of water, while the elliptical ova of *Anopheles* float in loose masses of 40 to 100 eggs, or isolated, each on its side, in natural collections of still or slowly flowing water. The larvæ of each, with the large thorax, flexible abdomen, and rotatory head, are very active, those of *Culex* feeding on animal matter, often at the bottom, and those of *Anopheles* chiefly on vegetable matter near the surface. The former, being slightly heavier than water, hangs vertically, with its head downwards and its long respiratory tube on the last segment but one of the abdomen just piercing the surface film of the water, these being air-breathing larvæ. *Anopheles* larvæ, on the other hand, have no respiratory tube, and lie horizontally just below the surface of the water, with the respiratory opening near the end of the abdomen touching the surface film. When disturbed a *Culex* larva will sink instantly to the bottom, while *Anopheles* will glide away near the surface, or descend by vigorous jerks of the abdomen, rising to the surface within about 15 minutes. The pupæ of these two genera are very much alike, except that *Anopheles*, the head of which is much more baggy, assumes a curled position, with its short and broad funnel-shaped respiratory tube at the surface of the water. In *Culex* the position of the pupæ is nearly perpendicular to the surface, and the respiratory tube long and slender. In each case this tube leads into the thorax, so that the pupa, unlike the larva, is supported head uppermost. The adults of these two forms are readily distinguishable. *Culex*, with its unspotted wings, has in the female very short palpi, one on each side of the proboscis, and in the male long, feathery palpi. The large and bloodthirsty adult of *Anopheles* has in most species spotted wings and long palpi in both male and female, the antennæ of the male in each case being large and feathery. When at rest *Culex* stands with its body bent, though more or less parallel with the surface on which it rests, while *Anopheles* has its body in a straight line, and more or less perpendicular to the wall on which it rests. The adult male is always vegetarian in habit, while the adult female may be vegetarian or sanguinary as circumstances permit, the blood of very many animals serving in place of that of man. The maintenance of species during dry or frosty weather is brought about by the persistence of the adult female in the former case, and of the adult female, or often larvæ, in the latter case, hibernation being a common occurrence. Fish, frogs, dragon-flies, and water-beetles help to keep down the superabundance of the larvæ and pupæ,

while the similar office is performed by birds, bats, and dragon-flies in catching and devouring the winged adults. The wide distribution of many species over the earth's surface is due almost entirely to man's agency, either by water in ships as in the Hawaiian Islands, or by trains as in the case of many newly-opened inland centres.

The chief Australian forms are three species of *Anopheles* in Queensland and the Blue Mountains, N.S.W., one species of *Megarhinus*, a form with a curved proboscis, of which practically nothing is known as to its life-history; and in Victoria, *Stegomyia fasciata*, a spotted form with banded legs, which serves as the carrier of yellow fever elsewhere, and *Culex frenchii* and *C. occidentalis*; also four species of purely vegetarian genera.

Malaria is carried from infected to healthy human individuals by *Anopheles* (chiefly *A. maculipennis*) after an interval of 7 to 8 days, which period is necessary for the development of the sexual phase in the wall of the gnat's stomach, and the formation and transport of the spores to the salivary glands, whence they are poured into the blood with the "poison."

Yellow fever is probably due to some protozoan parasite following a somewhat similar life-round to that of the malarial organism. The germ of yellow fever is carried by *Stegomyia fasciata* after a period of 10-13 days after its ingestion from an infected individual. Because this mosquito is found in Victoria it does not follow that there is any special danger of yellow fever, unless one or more cases of this disease were introduced and exposed in such a way as to allow the mosquitos to become infected by sucking the blood, and to then fly away to some healthy individual.

The Oriental tropical disease, filariasis, which is due to the presence of parasitic worms of the genus *Filaria* under the skin, is propagated by *Culex fatigans*, and possibly some other species, in which the embryos must pass part of their existence. It is considered probable that other diseases are also carried by mosquitos—*e.g.*, cholera, plague, Mediterranean fever, and typhoid.

Remedial work against the early stages of the life-history of mosquitos may be carried out by the treatment of breeding places with insecticides, such as kerosene poured on the surface of the pools once in seventeen days, or three weeks, the abolition of breeding places by filling with earth or drainage of swamps, or by the introduction of fish, frogs, &c. Screening of houses, smoking-out of rooms, and such measures, seem the only means of getting rid of the adults. The value of eucalyptus trees in driving away the adults, while great in some parts, is very doubtful in others.

DESCRIPTIONS OF SOME NEW SPECIES OF MALLOPHAGA FROM AUSTRALIAN BIRDS.—PART IV.

By S. A. LE SOUËF.

(Communicated by D. Le Souëf.)

(Read before the Field Naturalists' Club of Victoria, 11th August, 1902.)

GONOIDES RETRACTUS, found on Brown Quail, *Synæcus australis*.

Elongate ; a chestnut line round the body ; head somewhat oval and irregular, with a chestnut line running round the circumference, darker posteriorly ; clypeus semilunar ; antenna rather small, third joint hooked ; the temples have three prominent projections, central one being the largest ; prothorax nearly quadrate, narrowest anteriorly, rotundate posteriorly, separated from metathorax by band of fascia, which is divided centrally ; metathorax transverse, sides rotundate, concave anteriorly, surrounded by a deep chestnut band, which is divided on the median line ; legs pale, with a dark line on anterior femora and tibia ; abdomen clavate, ending abruptly in a concavity, each segment having an irregular dark line laterally, which is continued lightly towards the median line, which is light chestnut. Length, 2 mm. ; width, .90 mm.

GONOIDES LONGUS, found on Chestnut-bellied Quail, *Excalfactoria chinensis*.

Very long ; a ferruginous margin round the body ; head longer than broad, with a deep ferruginous margin ; clypeus semilunar, with a tricoloured margin ; antenna small and filiform ; eyes pale, small, and prominent ; prominent tubercle growing on the temples, with two very long hairs on its summit ; two smaller acute points on each side of occiput, base sinuous ; prothorax nearly quadrate, rotundate posteriorly, deep ferruginous margins ; metathorax transverse, sides rotundate, deep ferruginous margins, which are divided at the median line ; legs dark on anterior femora and on anterior and posterior tibia ; abdomen very long and clavate, bluntly serrated, and deep chestnut laterally, the colour extending inwards in a broad reducing band, which is pale in the first segment and meets in the last ; sixth segment broadest ; median line pale. Length, 2.50 mm. ; width, .75 mm.

TRINITON NIGER, found on Black Swan, *Chenopsis atrata*.

Elongate ; black and shining abdomen, with pale sutures ; head triangular, uniform brown, except clypeus, which is pale, and black markings behind the eyes ; palpi small, with pale sutures ; antenna small and pedunculate ; temporal lobes rotundate, base truncate ; prothorax with a triangular black mark in the centre, margins pale, with a projecting tubercle antero-

laterally on each side, base convex, nearly semilunar; mesothorax produced antero-laterally; metathorax deep brown, sides rotundate, base truncate; legs chestnut, anterior femora subovate, with a pale band anteriorly, second and third pair margined with deep chestnut; abdomen elongate, elliptical, lateral margins deep chestnut, sutures pale, last two segments yellow throughout. The body and legs are clothed with long hairs. Length, 7 mm.

This species is the largest of the genus; it is very strong, and swift in its movements. I have found it only on the Black Swan.

ORNITHOBIUS FUSCUS, found on Black Swan, *Chenopsis atrata*.

Female chestnut, with centre of head and thorax and centre and sutures of abdomen pale; head large and cordate; clypeus obtuse, with six hairs growing from each side; antenna large and filiform, pale; temples nearly semilunar and chestnut, darker towards the margins; centre of the head pale and broadly channelled, base concave; prothorax nearly quadrate, rotundate anteriorly and posteriorly, deep chestnut laterally, and channelled; metathorax broad and rotundate laterally, chestnut antero-laterally, pale posteriorly and in the centre; legs pale, with anterior femora and tibia chestnut; abdomen clavate, each segment chestnut with a pale centre, with one or two hairs growing laterally at each segment; sutures pale. Length, 4.50 mm.

Found (generally on the wing primaries) on the Black Swan. I have also met with it on the Australian Spoonbill and on the White Swan; but this latter must have been a stray, since the Black and White Swans were together, and it has not been reported from this bird from other countries.

DESCRIPTIONS OF SOME AUSTRALIAN BIRDS' EGGS.

BY D. LE SOUEF, C.M.Z.S., &c.

CALYPTORHYNCHUS MACRORHYNCHUS, Great-billed Black Cockatoo
(Cat. Birds Brit. Mus., vol. xx., p. 110).

This bird nests in the hollow limbs of the eucalyptus trees in the neighborhood of Port Darwin, Northern Territory, and is, I think, the only Australian cockatoo that has not had its eggs so far described.

The eggs were laid on the decomposed wood at the bottom of the hollow, and there was only one egg in each of the three nests found, so it is probable that that is the usual number, as with the Banksian Cockatoo, and all three were found in July, which therefore appears to be their breeding month. The eggs are

white, and elongated in shape; the shell is finely pitted, and one has a few limy nodules on the larger end; they have very little gloss, and measure—(a) 1.88 x 1.35 inches; (b) 1.89 x 1.22; (c) 1.91 x 1.22 inches. It will be noticed that one is slightly more rounded than the others.

NINOX CONNIVENS (sub-species OCCIDENTALIS), Western Winking Owl (Proc. Linn. Soc. N.S.W., 2nd series, vol. i., p. 1,086).

A clutch of three fresh eggs of this fine owl was found on 25th July in the western portion of the Northern Territory of Australia. As far as I know they are undescribed. They were laid at the bottom of a hollow spout in a eucalyptus tree on decomposed wood. They are a swollen oval in shape, pure white, and slightly glossy, and measure—(1) 1.78 x 1.54 inches; (2) 1.82 x 1.52 inches; (3) 1.76 x 1.52 inches.

NINOX STRENUA (*N. rufa*, Gould), Powerful Owl (Cat. Birds Brit. Mus., vol. ii., p. 178).

This large bird has a wide range over Australia, extending from Victoria to the Northern Territory, *viâ* the eastern side. The only previous description of its egg that I can find is in Mr. A. J. Campbell's book, of a specimen in the Adelaide Museum, but which has no data.

One fresh egg of this bird was found in a good-sized hollow in the trunk of a eucalyptus tree, near Port Darwin, on 2nd August, and although the bird was on the nest the clutch was probably not complete. The egg was laid on the decayed wood at the bottom. It is a swollen oval, pure white, and slightly glossy, and measures 1.96 x 1.56 inches.

These eggs will be exhibited at the October meeting of the Field Naturalists' Club.

SANGUINEOUS HONEY-EATER.—During the months of June and July the Sanguineous Honey-eater, *Myzomela sanguinolenta*, made its appearance in considerable numbers at Bayswater. Master Leslie Chandler (the son of an old member of this Club) wrote to say that the birds were most numerous on the white Epacris blossom, which appeared to possess a special attraction for these beautiful little birds. I was delighted to receive this note, as some years ago, when I reported seeing one of these birds at Bayswater, there was some doubt in the minds of several members as to the identity of the bird. Master Chandler has since sent me a couple of skins.—G. A. KEARTLAND.

CORRECTION.—The word "White" should not have appeared in the title of the paper contributed by Mr. Frank Madden, M.P. (see pages 55 and 72). The notes referred to the Ibis family in general, and not to any particular species.—ED. *Vict. Nat.*

The Victorian Naturalist.

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No. 227.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 13th October, 1902. The president, Mr. T. S. Hall, M.A., occupied the chair, and about 50 members and visitors were present.

REPORTS.

A report of the excursion to the Yarra at Kew on Saturday, 27th September, was read by the leader, Mr. F. G. A. Barnard, who said that the party had enjoyed an interesting ramble amid picturesque scenery. The most noticeable flowering plants obtained were *Styphelia strigosa*, restricted to a small area on the top of a stony bank; *Acacia pycnantha*, *A. acinacea*, *Myoporum viscosum*, *Nicotiana suaveolens*, and *Indigofera australis*.

A report of the excursion to Eltham on Saturday, 11th October, was given by Mr. J. Stickland, in the absence of the leader, Mr. C. Maplestone. The party visited a picturesque spot near the Yarra known as the "Devil's Bank," but the botanical results of the outing were not very striking. Lists of the flowering plants and of the cryptogams collected were given by Messrs. G. Weindorfer and R. A. Bastow. Few specimens of pond-life were obtained, but among these was an interesting protozoan not yet identified.

The hon. librarian reported the receipt of the following donations to the library:—*The Emu*, October, 1902, from the Australasian Ornithologists' Union; "Journal and Proceedings of the Royal Society of New South Wales," vol. xxxv., 1901, from the society; "Annual Report Sydney Botanic Gardens, etc.," 1901, by J. H. Maiden, F.L.S., Director, from the Director; "Transactions and Proceedings of the New Zealand Institute," vol. xxiv., 1901, from the Institute; *Nature Notes*, September 1902, from the Selborne Society, London; *Knowledge*, September, 1902, from the proprietor.

GENERAL BUSINESS.

In the absence of the hon. secretary, Mr. J. A. Kershaw, through ill health, Mr. G. Coghill reported that the recent conversazione had in every way proved a decided success, and that there would be a small credit balance when the accounts were finally closed.

PAPERS.

1. By Mr. E. E. Green, F.E.S., Government Entomologist, Ceylon, entitled "Notes on a Singular Coccid from Victoria" (communicated by Mr. C. French, F.L.S.)

The author stated that some specimens of a coccid found on some old and wet timber in the 300-foot level of a mine in Gippsland, and forwarded to him by Mr. C. French, F.L.S., had proved on examination to be specimens of *Orthezia floccosa*, De Geer, the first record of an *Orthezia* from the Australian region.

2. By Mr. F. M. Reader, F.R.H.S., entitled "Contributions to the Flora of Victoria," No. XII. (communicated by Mr. J. A. Kershaw, F.E.S.)

The author described as new a minute plant, belonging to the order Restiaceæ, on which he bestowed the name of *Centrolepis cephaliformis*, and compared it with other members of the genus.

3. By Mr. G. Weindorfer, entitled "On the Fertilisation of Phanerogams—1. Dispersion of Pollen by the Wind."

The author drew attention to the various provisions in flowers by which the dispersal of their pollen by wind for purposes of fertilization is promoted or assisted, and briefly referred to the shapes of the stigmas and to the vast numbers of cells composing the pollen.

The President, by means of blackboard sketches, illustrated the subject of the paper, and gave further details of the actual fertilization.

NATURAL HISTORY NOTES.

Mr. J. C. Goudie, of Birchip, forwarded some notes on a number of interesting observations made during a recent trip in the Mallee.

Mr. G. A. Kéartland mentioned that the whole of the Club's recommendations with regard to the close season for certain birds had been embodied in the recently published schedule of the *Game Act* but that all reference to fish had been omitted, evidently a departmental error, and moved that a letter be written to the Department, asking if the omission of fish was not an oversight. This was seconded by Mr. F. G. A. Barnard and carried.

Mr. J. Gabriel drew attention to the fact that Mutton-birds are now protected at Phillip Island.

Mr. A. Coles said he thought it was rather hard that, owing to the provisions of the *Game Act*, persons were not allowed to keep certain native animals and birds as pets.

Mr. A. Mattingley stated that authority could be obtained by those who had pets in their possession for some time to retain them.

Mr. G. A. Kéartland described the changes which had taken

place in the plumage of a female quail in his possession, and which was now assuming the garb of a typical male bird.

EXHIBITS.

By Mr. F. G. A. Barnard.—Fifteen species of wild flowers from Plenty Ranges, including *Grevillea alpina*, *Eriostemon correfolius*, *Bauera rubioides*, *Sprengelia incarnata*, and *Goodia lotifolia*.

By Mr. R. A. Bastow.—Specimens of mosses collected on the Club's excursion to Eltham on Saturday, 11th October.

By Mr. A. Coles.—Skin of Black Snake, *Pseudechys porphyriacus*, measuring seven feet six inches in length, shot at Stratford, Gippsland.

By Mr. C. French, jun.—Scale Insect, *Lecanium berberides*, now doing considerable damage to vines in Victoria.

By Master C. French.—Stone used by aborigines for grinding food, from Terang, Victoria.

By Mr. J. H. Gatliff.—The following marine shells:—*Solarium perspectivum*, Linn., *Solarium perdia*, Hinds. (including a specimen obtained by Mr. D. Le Souëf at the Barrier Reef, North Queensland); *S. ethiopica*, Pease; *S. reevei*, Pils.; *S. crenella*, Linn.; *S. cingulum*, Kien.; *Phillipa lutea*, Lamk.

By Mr. G. A. Kearnland.—Collection of eggs of all known Australian Cockatoos, as follows:—*Microglossus aterrimus*, *Calyptorhynchus macrorhynchus*, *C. stellatus*, *C. baudini*, *C. leachii*, *C. banksia*, *C. funereus*, *Callocephalon galeatum*, *Cacatua galerita*, *C. leadbeateri*, *C. sanguinea*, *C. gymnopsis*, *C. roseicapilla*, *Licmetis nasica*, *L. pastinator*. Also native sheath knife and fishing lines from Northern Territory.

By Mr. D. Le Souëf.—Clutch of eggs of Western Winking Owl, *Ninox connivens*, sub-sp. *occidentalis*, and eggs of Powerful Owl, *Ninox strenua*, North Australia, and Great-billed Black Cockatoo, *Calyptorhynchus macrorhynchus*, North Australia.

By Mr. J. G. Luehmann.—Victorian plants from new localities, collected by Mr. H. B. Williamson, Hawkesdale.

By Mr. J. Stickland.—The Star Puff-ball (Geaster), from Eltham.

After the usual conversazione the meeting terminated.

NOTES ON A SINGULAR COCCID FROM VICTORIA.

By ERNEST E. GREEN, F.E.S., Government Entomologist,
Ceylon.

(Communicated by C. French, F.L.S.)

(Read before the Field Naturalists' Club of Victoria, 13th Oct., 1902.)

SOME examples of a coccid forwarded to me by Mr. C. French, Government Entomologist, Department of Agriculture, Victoria,

have proved on examination to be specimens of *Orthezia floccosa*, De Geer. They were found "on some old and wet timber at the 300-foot level in a mine in Gippsland, Victoria," a truly remarkable situation in which to find living Coccidæ! The food of *O. floccosa* has not been absolutely determined in Europe. The insects are usually found amongst wet moss or Sphagnum, and it is possible that they may feed either on these mosses or upon Algæ associated therewith. All the species of *Orthezia* appear to be able to exist for long periods without food (a characteristic found also in many Monophlebinæ). It is possible that these individuals from the mine may have been carried down from the surface with the timber, and to have sustained themselves upon small cryptogamic plants during their sojourn underground. These same examples survived the journey by post from Australia to Ceylon, absolutely without food, and are still living in the pill-box in which they were received.

In comparing the insects with European species for the purposes of determination I noticed a character in *O. floccosa* which does not appear to have been remarked before, distinguishing it from all its allies, but connecting it with *Ortheziola*. The tibio-tarsal articulation is absent in all the legs, and the terminal segment of the antenna is apparently composed of two fixed joints, forming a scape-like termination, the antennæ thus consisting of seven distinct joints as in *Ortheziola* to eight in other species. In *Ortheziola* another remarkable character is the very long basal joint of the antennæ; the number is still further reduced, three only being apparent.

Signoret (Essai, p. 424) considers *floccosa* to be a synonym of *urticæ*, L., but it seems evident to me that he has confused the two species in his description, and figures (plate xxi., fig. 1b) which Signoret suggests (with a query) may be male larvæ of *urticæ* is really the adult of *floccosa*. His drawing correctly represents it with fixed tibio-tarsus and long terminal joint to the seven-jointed antennæ.

This is the first record of an *Orthezia* from the Australasian region. I have compared the Australian insect with examples from Bohemia and England, and it agrees with the typical form in every character. With this connecting link it is a question whether *Ortheziola* should rank as more than a sub-genus. Another sub-genus might be erected for the species having fixed tibio-tarsus with seven-jointed antennæ. I would suggest the name *Douglasia* for the proposed sub-genus, in honour of the veteran entomologist whose valuable papers on Coccidæ were a feature of the "Annals" for so many years. Type, *Douglasia floccosa*.

CONTRIBUTIONS TO THE FLORA OF VICTORIA.

No. XII.

BY F. M. READER, F.R.H.S.

(Communicated by J. A. Kershaw, F.E.S.)

(Read before the Field Naturalists' Club of Victoria, 13th Oct., 1902.)

CENTROLEPIS CEPHALOFORMIS, sp. nov., F. M. Reader.

A minute, moss-like, glabrous plant, growing frequently in head-like tufts, from 2 lines to 1 inch in diameter. Leaves shorter than or as long as the scape and spike usually 4 or 5, with a broad scarious sheathing base, tapering in a linear or subulate, usually recurved upper part, and ending in a fine transparent point; the lower broad part about half the size of the whole leaf. The inner leaf reduced to a membranous sheath, broad, white, shining, and blunt; vein strong, green or brownish. Scapes very short, about $\frac{1}{8}$ of an inch long. Floral bracts close together; outer bract with the upper subulate recurved and fine point about 2 lines long, the subulate portion shorter than the broad membranous part of the bract; inner bract narrower, without a point, about 1 line long, with a narrower scarious margin. Flowers three, two in the outer and one in the upper bract, two of them only with a stamen each, and no hyaline scales in any of the heads examined. Styles connate to about the middle. Carpels usually 6 to 10.

Flowering specimens may be found as well in September as in October and November. Sandy desert, Lowan, 1892; F. M. Reader.

This species is distinguished from *C. humillima*, which closely resembles it, by the three flowers and two bracts. It differs from *C. polygyna* in the number of flowers in the filament, being free from the axis of the carpels, and in always being of a green or pale colour. *C. alepyroides* has the scapes much longer and slender, and an inner scale to each flower, with fewer carpels. From *C. glabra* it is distinguished by the stouter scapes, number of flowers, &c. From *C. nutica* also it differs in the number of flowers, the stout and short scape, and the number of carpels. It is allied to the Tasmanian *C. muscoides*; but there are three flowers in the new species, the floral bracts are much broader, and the inner bract much shorter. The Tasmanian species *C. monogyna* has narrow and short bracts, and one stamen, one ovary, and one single carpel only. From *C. pulvinata*, a third Tasmanian species, *C. cephaloformis* is separated by its shorter and stouter scapes, longer floral bracts, by the flowers, and absence of scales; and, lastly, from the Queensland *C. pusilla* this new species is different in the outer bract, being larger, in the absence of the scales, and in the connate styles.

ON THE FERTILIZATION OF PHANEROGAMS.

I.—DISPERSION OF POLLEN BY THE WIND.

BY G. WEINDORFER.

(Read before the Field Naturalists' Club of Victoria, 13th October, 1902.)

FOR the conveyance of pollen between flowers there exist two main agents, viz., the wind and insects. Phanerogamous plants have been separated by botanists into "anemophilæ," or wind-fertilized, and "entomophilæ," or insect-fertilized plants.

As would be naturally expected, it is, speaking generally, only pollen of a dusty consistency which is transported by the wind; but the pollen of some flowers is occasionally torn away from the anthers, in the form of sticky masses, and conveyed to the stigmas of neighbouring flowers by the wind, but the occurrence can only be looked upon as accidental, and would happen only in the rarest instances.

Still more remarkable is the fact that in certain water plants the pollen, though cohering in sticky masses, is blown by the wind in a kind of little boat to the stigmas, which are raised above the surface of the water. The phenomenon was first observed on *Vallisneria spiralis*, a water plant, widely distributed in Southern Europe and also in Australia. Here we have a plant, living under water, whose leaves, arising from the stems, are erect, very long, and like thin ribbons. In the axils of these leaves a variety of buds are produced, of which generally two grow straight upward. Each of the upward growing shoots produces a kind of bladder in which are the flower buds. These, hitherto connected with the axis of the raceme by diminutive stalks, become detached, ascend in the water, and float about on the surface. Three concave leaflets (the sepals), which form the outer whorl of the perianth, are thrown back, and assume the appearance of three boats connected together at one spot, and the stamens project obliquely up into the air. The opening of the petals is immediately followed by the dehiscence of the anthers, which contain generally only thirty to forty comparatively large and very sticky pollen cells. The three sepals underneath the anthers respond to the slightest movements of the water without upsetting, and are blown to and fro by the wind, and accumulate in the neighbourhood of fixed bodies. When the little craft happen to get stranded in the recesses of a female *Vallisneria* flower they adhere to the three-lobed stigma, and some of the pollen cells are sure to be left sticking to the fringes of the margin of the stigmatic surfaces. This kind of fertilization through the wind is known in only thirteen species of the *Hydrocharideæ*.

The number of plants which produce pollen in form of a fine dust, and wherein the pollen is dispersed exclusively and throughout the period of flowering by the winds, would probably exceed 10,000—about a tenth of the total number of Phanerogams. One

striking characteristic of these exclusively wind-fertilized plants is the absence of fragrant and bright-coloured flowers, while the interior of the flower is destitute of honey and perfume; among such may be mentioned conifers, beeches, poplars, walnut, many palms, and the grasses and sedges. It is of no advantage to these flowers to be visited by insects, and accordingly they have no need of any devices for attracting bees, butterflies, or flies. Of course the flowers of the plants in question are not infrequently visited by insects, but these visitors play only a very subordinate part in the dispersion of the pollen.

Wind-storms, whether with or without rain, are anything but beneficial in the dispersion of pollen. The pollen, removed from the spot where it has been crowded together within the province of the flower, and contained in a space about the size of a pin's head, has to be scattered over an area many million times as great. A gradual dispersion is occasioned only by a gentle wind, and thus the light breezes which sweep through valleys shortly after sunrise, ascending air currents, or the alternating land and sea breezes of the coast winds are the most favourable agents of pollination.

The form of distribution of the stigmas to be covered with dust pollens are also in harmony with these conditions. Most anemophilous plants have dioecious or monoecious flowers, and those which develop hermaphrodite flowers exhibit complete dichogamy—that is to say, the andræcium and gynæcium ripen at different times, so that when mature pollen is distributed the stigmas of the same flowers are already withered, and therefore not in a condition to receive the pollen cells, or they are still so immature that they cannot be covered with pollen. The pollen has therefore to be blown to other flowers in the neighbourhood, whose stigmas happen to be in the receptive stage of development. In all these dichogamous plants the flowers with stigmas in the receptive condition are situated higher than the anthers from which the mature pollen is committed to the wind. Therefore in order to reach the receptive stigmas the pollen must travel upwards, and it is unquestionably true, in the majority of cases, that the clouds of pollen which are carried off by moderate winds, at first soar upwards and either directly reach the stigmas awaiting them at a higher level, or later, as the pollen cells sink down, being deposited on the stigmas.

In some species, at the very moment when the anthers burst open the pollen, is ejected violently into the air and ascends obliquely in form of a little cloud of dust. This phenomenon is afforded by the nettles, whose filaments bearing the anthers are coiled in the bud, and suddenly spring up at the same moment that the dehiscence of the anthers takes place. In all these plants ejection of pollen only ensues when a light dry wind blows, which causes an alteration in the tension of the tissues concerned.

If there is no wind or if the air is close and damp, the ejection of pollen is postponed until the atmosphere has again become dry.

In another group of plants the anthers are borne on long filaments, and are set oscillating and vibrating by the least breath of wind, the pollen being in consequence discharged in little pinches. The flowers of this kind contain pistils as well as stamens, but they are dichogamous, and the pollen dust must be transported to other flowers which happen to be at a younger stage of development.

Prominent among the plants belonging to the first-mentioned category stand the grasses and sedges. With these temperature and the hygroscopic condition of the air in particular play an important part. The most favourable conditions for pollination in the case of most grasses prevail in the early morning, when the first rays of sunshine fall upon the flowers, and the temperature is rising gently. Under such conditions pollination is accomplished with astonishing rapidity. In some cases the glumes spring open, the stamens grow out, the anthers open, and the pollen is scattered all in the space of a few minutes.

In all the cases discussed hitherto the pollen escapes from the place where it originates into the air direct; but there is also a large number of plants whose pollen falls, in the first instance, on to some spot within the province of the flowers where it is protected from becoming wet, and in which it remains a period of varying duration. Very different parts of a flower are utilized in this manner as temporary halting-places for the pollen. The temporary deposition of the pollen on the backs of the flowers is common to all the numerous trees and shrubs which have their male flowers aggregated in pendant catkins or spikes, resembling tassels or fringes in appearance. The floral spikes of all these plants are erected at first, and in the form of short sticks, cones, or cylinders. A short time before the anthers burst the axis of the spike elongates and becomes pendant. The back of each flower is so contrived as to catch the pollen falling from the set anthers of the flowers above it, and retain it until the tassels are swinging by the wind, and the pollen is, in consequence, distributed.

A close connection exists between these various contrivances to ensure that pollination shall only take place at the best possible moments, and the maintenance of a free passage in the direction in which the pollen is to be transported by the wind, and, further, between these adaptations and the shape of the stigmas devised for the reception of the pollen. It is obvious that no barrier must be interposed in the path of the little clouds of pollen dust on their journey to the stigmas. On this account, also, all flowers which have the pollen blown out of them by the wind are arranged in spikes and panicles, and project freely into the air, and are never clothed with a mass of foliage.

Particular attention may be drawn to the fact that a large

number of plants, wherein the pollen is in form of dust, flower before coming into leaf. Were these plants to begin to blossom after the complete development of their extensive foliage the wind transport of the pollen would be rendered almost impossible. The pollen would be inevitably deposited upon these obstacles and stranded.

Regarding the stigmas, we find that in plants with dusty pollen they are invariably fashioned so as to catch the dust. In one case they are fleshy and swollen and have the surfaces which are exposed to the wind covered with a velvety coating; in another they are in the form of tufts of long papillose or capillary filaments. At the time when pollination takes place they are always fully exposed to the wind, and so placed that when the pollen cells are blown against them they are caught like midges in a spider's web. Yet, in spite of all these contrivances, it would remain very doubtful whether the stigmas would be dusted with pollen through the action of wind were it not for the concurrence of another circumstance. Supposing that only two thousand pollen cells are produced in an inflorescence, it would be only by a lucky chance that a single one of these cells would be caught by the stigmas of a plant at the distance of a few feet, but the number of cells constituting the pollen dust amounts to millions.

In years peculiarly favourable to the flowering of conifers, vast clouds of pollen are borne on gentle winds, and in the event of a thunderstorm pollen may be washed off the plants and run together by the water on the soil, leaving behind patches of a yellow powder, a phenomenon which has given cause for the statement that a fall of sulphurous rain has taken place.

ON THREE APPARENTLY UNDESCRIBED SPECIES OF AUSTRALIAN BIRDS.

BY ALFRED J. NORTH, C.M.Z.S., Ornithologist, Australian
Museum, Sydney.

RHIPIDURA INTERMEDIA, sp. nov.

Adult male.—Like the adult male of *Rhipidura rufifrons*, Lath., but distinguished from that species by the less extent of orange-rufous on the basal half of the tail feathers, the terminal half being blackish-brown, and distinctly tipped with white: by the narrower black band on the lower throat, the less scale-like appearance of the feathers on the fore-neck, and the centre of the breast and abdomen being white, the latter washed on the sides with pale fawn-buff; sides of the breast ashy brown; under tail coverts pale fawn colour. Total length, 5.9 inches; wing, 2.9; tail, 3.3; bill, 0.32; tarsus, 0.7.

Hab.—Scrubs of the Bellenden-Ker and Seaview Ranges, North-Eastern Queensland.

Type.—In the Australian Museum.

Dr. Sharpe's description of *Rhipidura rufifrons* in the "Catalogue of Birds in the British Museum," vol. iv., p. 319 (1879), evidently applies to this species, for he describes the tail feathers as being "distinctly tipped with white." The type of *Rhipidura rufifrons* characterized by Dr. Latham, was obtained in New South Wales, and has the tips of the tail feathers pale brown, not white. In the latter respect *Rhipidura intermedia* agrees with *R. torrida*, described and figured (Proc. Zool. Soc., 1865, p. 477, pl. xxviii.) by Dr. Alfred Russel Wallace, from the island of Ternate, but *R. torrida* differs from *R. intermedia* in having the ear-coverts and upper breast black.

The eggs of *R. intermedia* are indistinguishable from those of its ally, *R. rufifrons*, being oval in form, of a pale cream ground colour, and slightly darker at the larger end, where they are dotted and spotted with dull umber-brown, intermingled with a few underlying spots of faint bluish-grey. A set of two measure:—length (A), 0.69 x 0.52 inches; (B), 0.68 x 0.49 inches.

CALAMANTHUS ALBILORIS, sp. nov.

Adult female.—Like the adult female of *Calamanthus fuliginosus*, Vigors and Horsfield, but distinguished from that species by having a large triangular-shaped white patch in front of the eye, joining the white eyebrow above, and extending in a broad line of white feathers below the eye. Total length, 5.2 inches; wing, 2.15; tail, 2; bill, 0.5; tarsus, 0.9.

Hab.—Victoria.

Type.—In the Australian Museum.

The specimen of *Calamanthus*, in which the above distinguishing characters have been pointed out, forms part of the Old Collection of the Australian Museum, and nothing is known of its history beyond that given on the label—"Calamanthus fuliginosus, Victoria, 1865." Formerly I regarded the species of Reed-Lark found by me breeding near Melbourne as *C. campestris* (Nests and Eggs Aust. Birds, p., 148, 1889); but, from the situations it frequented, I have no doubt now it was *C. fuliginosus*, or, perhaps, the present species, *C. albiloris*. All the eggs I took were, however, distinctly smaller than those of *C. fuliginosus* obtained in Tasmania, and agreed precisely in size and their average paler colour with the eggs of *Calamanthus campestris* taken in South Australia. Dr. Sharpe, in the "Catalogue of Birds in the British Museum," vol. vii., p. 502-3 (1883), includes Victoria in the habitat of *C. campestris*, but omits that State from the habitat of *C. fuliginosus*. The latter is clearly an oversight, for in the list of specimens enumerated by him is one from Melbourne. I have never handled or seen a properly localized specimen of *C. campestris* from any part of Victoria.

[Since the above was sent to press Mr. Kearland has forwarded me a specimen of an adult female obtained by him at Clayton,

Victoria. It belongs to the present species, *Calamanthus albiloris*, but the loreal patch, eye-brow, and line of feathers below the eye are not so well defined as in the type, and are of a dull white.]

AMYTIS MODESTA, sp. nov.

Amytis textilis (nec Quoy and Gaim.), Gould, Birds Aust., fol., vol. iii., pl. 28 (1848).

Amytis textilis, North, Rep. Horn. Sci. Exped.—Zool., p. 79 (1896), part.

Adult male.—Like the adult male of *A. textilis*, Quoy and Gaimard, but distinguished from that species in having the head and upper parts of a much paler brown, the line extending from the nostril above the anterior portion of the eye of a very pale rust-red, the throat whitish; remainder of the under surface pale isabelline, becoming slightly darker on the sides of the neck and breast, the former indistinctly streaked with white; sides of the abdomen, flanks, thighs, and under tail coverts pale isabelline-brown. The bill, too, is deeper in shape and not so pointed at the tip as in that of *A. textilis*. Total length, 6.5 inches; wing, 2.55; tail, 3.2; bill 0.42, depth at nostril 0.22, breadth at nostril 0.2; tarsus, 0.95.

Hab.—Central Australia, South Australia, New South Wales.

Type.—In the Australian Museum.

Mr. Keartland has always contended that some of the birds brought back by the Horn Scientific Expedition from Central Australia, and regarded by me as the immature female of *Amytis textilis*, belonged to a distinct species. In support of his opinion he has since sent me several skins, and among them the adult male described above, which was obtained near Meerenie Bluff, Central Australia. This specimen agrees fairly well with Gould's figures of *Amytis textilis*, except that it has not any rust-red patch on each side of the breast, but this is apparent in a female shot at the nest. Others obtained in South Australia and Western New South Wales show more or less indication of this rust-red patch, the throat also being very pale isabelline, and which, together with the upper breast, is more distinctly streaked with white. None, however, approach any way near in depth of colour to what I regard as the true *Amytis textilis* of Quoy and Gaimard. These authors, in the Atlas of the "Voyage of the *Uranie*," also Lesson in his "Traité d'Ornithologie," represent *A. textilis* with the under as well as the upper surface distinctly streaked with white, while Gould figures the birds he procured on the plains bordering the Lower Namoi River in New South Wales with the under parts like those I propose to distinguish under the name of *Amytis modesta*. Eggs of the latter species received from Mr. Keartland are not to be distinguished from those of *A. textilis*, previously described by me in the Zoology of the Horn Expedition. A set of two taken by Mr. C. E. Cowle near Illamurta, Central Australia, are oval in form and of a reddish

white ground colour, which is freckled and spotted with rich reddish-brown, more abundantly on the thicker end :—length (A), 0.8 x 0.77 inches ; (B), 0.8 x 0.77 inches.

NEW DISTRICTS FOR VICTORIAN PLANTS.

THE following plants, from various localities, have been identified by Mr. J. G. Luehmann, F.L.S., Government Botanist, and are now recorded as new for the respective botanical regions of Victoria, while *Schoenus sculptus* is new for Victoria. Specimens of each were exhibited at the October meeting of the Field Naturalists' Club :—

PITTOSPOREÆ—

Billardiera cymosa, F. v. M. ... — S.W. — — —
(Victoria Ranges, 1,500 ft., Nov., 1901.)

SALSOLACEÆ—

Kochia brevifolia, R. Br. ... — — S. — —
(Geelong, January, 1896.)

MYRTACEÆ—

Eucalyptus dives, Schauer ... — S.W. — — —
(Grampians, December, 1901.)

COMPOSITÆ—

Calotis anthemoides, F. v. M. ... — S.W. — — —
(Dunkeld, November, 1901.)

Helichrysum rutidolepis, D. C. ... — — — N.E. —
(Murray River, near Rutherglen, Dec., 1901.)

Calocephalus citreus, Lessing ... — — — N.E. —
(Near Rutherglen, December, 1901.)

CYPERACEÆ—

Cyperus tenellus, Linn. ... — S.W. — — —
(Hawkesdale, November, 1901.)

Chorizandra cymbaria, R. Br. ... — S.W. — — —
(Hawkesdale, November, 1901.)

Schoenus sculptus, Boeckeler ... — — — N.E. —
(Unrecorded for Victoria. Near Euroa, December, 1901.)

Lepidosperma elatius, Labill. ... — S.W. — — —
(Hawkesdale, November, 1901.)

GRAMINEÆ—

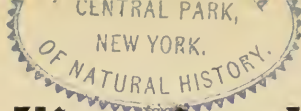
Poa lepida, F. v. M. ... — S.W. — — —
(Port Fairy, November, 1901.)

Festuca Hookeriana, F. v. M. ... — S.W. — — —
(Hawkesdale, December, 1901.)

INTRODUCED PLANTS CONSIDERED NATURALIZED.

Bellis perennis, Linn. Portland, 1894, and November, 1901.

Soliva sessilis, Ruiz and Pav. Hawkesdale, 1893. (Unrecorded for Australia.) H. B. WILLIAMSON, Hawkesdale.



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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 17th November, 1902. The president, Mr. T. S. Hall, M.A., occupied the chair, and about 50 members and visitors were present.

CORRESPONDENCE.

From the hon. secretary, Mr. J. A. Kershaw, regretting his inability to be present, owing to ill-health and absence from Melbourne. On the motion of Messrs. J. Shephard and O. A. Sayce, the acting hon. secretary, Mr. G. Coghill, was requested to convey to Mr. Kershaw the members' sincere regrets at his continued illness, and to express the hope that he would soon be able to resume his accustomed duties.

The president welcomed Mr. O. A. Sayce to the Club again after his recent severe illness, and mentioned that certain of Mr. Sayce's work on the fresh-water Crustaceans had been referred to by Prof. Howes in his address at the recent meeting of the British Association for the Advancement of Science.

REPORTS.

A report of the excursion to Sandringham on Saturday, 25th October, was furnished by the leader, Mr. C. French, jun., who stated that there was a fair attendance of members. The more interesting plants met with on the swampy ground were:—*Claytonia australasica*, *Utricularia dichotoma*, *Limnanthemum exaltatum*, *Lobelia pratioides*, *Epacris obtusifolia* (rare), and the orchid *Microtis atrata*. On the higher ground were found:—*Daviesia ulicina*, *Aotus villosa*, *Pultenaea palacea*, *Pimelia octophylla*, and *Thelymitra antennifera* with a species of rust fungus on the stem. After considerable search two fine specimens of the orchid *Thelymitra epipactoides*, once common here, were found. Several scale-insects were collected, but other insects, with the exception of the very destructive Cherry Beetle, *Diphucephala rugosa* (literally in millions), and *Stigmodera macularia*, were scarce. Specimens of the Southern Blue-tongued Lizard, *Cyclodius nigro-luteus*, and *Grammatophora muricata* were taken.

A report of the excursion to the Lerderderg Ranges, instead of the Werribee Gorge, on Monday, 10th November, under the leadership of Mr. C. C. Brittlebank, was furnished by Mr. F. G. A. Barnard, who said that though the results were not

very important an interesting day had been spent. Some fine specimens of the orchid *Pterostylis rufa* had been collected, and altogether about forty species of plants were noted in bloom.

A report of the "camp-out" at Shoreham, Western Port Bay, from Friday, 7th November, to Monday, 10th November, was read by the leader, Mr. S. W. Fulton, who gave a general account of the outing, the results of which were on the whole very satisfactory. Detailed reports were read by Mr. G. Weindorfer, on the Botany; by Mr. S. W. Fulton, on the Crustacea; by Mr. A. Mattingley, on the Echinoids; by Mr. G. B. Pritchard, on the Conchology, Geology, and Minerology; and by Mr. F. Chapman, on the Foraminifera, and a note on the occurrence of musical sand.

The president congratulated the Club on the excellent series of reports submitted to the meeting.

The hon. librarian reported the receipt of the following donations to the library:—*Journal of Agriculture of Victoria*, September, 1902, also various Bulletins, from Department of Agriculture, Victoria; "Annual Report for 1901 of the Department of Mines, New South Wales," from the Department; "Researches on the Eucalypts," from Technological Museum, Sydney; "Proceedings Linnean Society of New South Wales," vol. xxvii., part 2, from the Society; *Nature Notes*, October, 1902, from the Selborne Society, London; *Knowledge*, October, 1902, from the proprietor; and *Knowledge* 1897, 1898, 1899, from Mr. F. G. A. Barnard.

ELECTION OF MEMBERS.

On a ballot being taken, Misses Kate and Laura Cowle, of 138 Clarendon-street, East Melbourne, were elected members of the Club.

PAPERS READ.

1. By Mr. A. D. Hardy, entitled "Some Notes on Nigeria."

The author gave an interesting account of the country and of natural history objects noted during a residence of some months at Old Calabar, Nigeria, West Africa.

The paper was discussed by Mr. D. Le Souëf, who drew attention to the many points of resemblance in plants and insects with those of Northern Queensland, and by Messrs. A. J. Campbell, F. G. A. Barnard, and A. Mattingley. Owing to the lateness of the hour, the other papers were postponed.

AUSTRALASIAN ORNITHOLOGISTS' UNION.

The chairman drew attention to the meetings of the Union to be held in Melbourne during the week.

EXHIBITS.

By Mr. F. G. A. Barnard.—Ordovician Slates from Lerderderg Ranges, also eucalyptus leaf 14 inches long.

By Messrs. D. Best and C. Walter.—Eleven species of *Acacia* from the Victorian Alps, flowering in October ; also *Grevillea victoriae*, F. v. M., the emblem flower of the Victorian Alps.

By Mr. F. Chapman, A.L.S.—Musical sand and Foraminifera from Shoreham.

By Mr. C. French, jun.—Double flowers of *Epacris impressa* (red variety), collected by J. T. Paul, Grantville ; rare Victorian Blue-tongued Lizard (alive), *Cyclodus occipitalis*.

By Master C. French.—Rare Victorian orchid, *Caladenia cairnsiana*, collected at Ringwood ; Loranthus (Mistletoe), showing two leaves just developed.

By Mr. A. D. Hardy.—Photographs, woven cloths, &c., and natural history specimens from Nigeria, West Africa, in illustration of his paper.

By Mr. G. B. Pritchard.—Marine shells from Shoreham, including *Conus segravei*, *Cancellaria maccoyi*, and *Astele subcarinata* ; shells, flints, &c., from old kitchen midden of the aborigines, Flinders, Ocean Beach ; Selwyn's early map sections and reports on the Mornington Peninsula.

After the usual conversazione the meeting terminated.

THE SHOREHAM CAMP-OUT.

THE morning of 7th November opened fine and bright, and promised well for our second visit to Shoreham—a great contrast to the forbidding weather we faced at Easter. The advance party, consisting of nine, left Flinders-street by the 8 10 a.m. train for Bittern railway station. The journey was a pleasant one, and the wild-flowers along the line called forth the admiration and raised the hopes of our botanical members, who would have put on the breaks and brought the train up, if they had known how, just to secure a treasure here and there. On arrival at Bittern a special conveyance for our camp equipment and personal effects was in waiting, and while the luggage was being packed away several of the party indulged in a light breakfast or cup of tea. Six of us took our seats in Haddon's coach, while the other three took the road on bicycles. A stop was made at the two stores to pick up bread and groceries ordered in advance, and while the coach made a detour to deliver its mails at Balnarring Post-Office five of the party walked along the direct road and met the coach about a mile further on. The bicycle party did not fare so well, for later we noticed one of them ensconced on the top of our luggage with his bicycle, which had broken down.

Arriving at our old camp at 12.30, we were not long in pegging out our sleeping claims and getting ready for a mid-day meal. The services of a local camp-man having been arranged for, we found the house open and a fire going, so a billy was quickly un-

packed and put on to boil. Two doors pressed into service made an excellent table when mounted on trestles, and as the forms, &c., made the last time were still there it did not take us long to make things comfortable. A detailed description of the camp's surroundings is unnecessary, being fully described in the May number of the *Naturalist*, vol. xix., page 7, in the report of the Easter camp-out. After a solid lunch we spent the afternoon on the beach; but as the tide was coming in fast no work could be done on the reefs, and the party straggled off in twos and threes up the creeks and gullies, collecting insects and plants, which might be of interest to some other member in camp or at home. Returning to the camp about 6 p.m., dinner was got under way and served up as the second instalment of our party, who had come down by the afternoon train, arrived on their bicycles, and were not slow at settling to the good things provided.

The party now consisted of Messrs. F. Chapman, R. Coghill, Roy Felstead, C. Frost, Dr. J. C. Kaufmann, J. Leach, A. Mattingley, V. R. M'Nab, W. J. M'Caw, D. W. Patterson, G. B. Pritchard, H. Summers, A. O. Thiele, E. O. Thiele, and G. Weindorfer, with S. W. Fulton as leader.

The evening was spent in making our plans for the trip, and discussing the prospects and merits of the surrounding collecting grounds, and then to bed and rest to prepare us for the astounding feats of the morrow.

Rising early on Saturday morning (4.45 a.m.), and breakfast disposed of, we made along the shore towards Shelly Beach, some members of the party, according to their bent, dropping out to search the reefs for specimens until driven off by the rising tide. The "shell-men" returned later, and were not too well satisfied with their takings; but it must be remembered most of them had spent a lot of time on the same beach last Easter, and what were treasures to them then did not call for so much enthusiasm this trip; still they could not complain, as their report will show.

Sunday morning another early start was made. Seven of the party, who had brought bicycles for the occasion, made for the Basalt Cliffs, beyond Flinders, in quest of Zeolites, &c.; and judging from the equipment of heavy hammers and gads, the amount of bluestone brought home, and the wrecked state of their bicycles, there must have been a considerable alteration made in the coast line. But this is only the surmise of one who did not go out; those interested will doubtless put a better complexion of the result of their trip in their report on the minerals found.

Our botanist, Mr. Weindorfer, was most energetic, walking over to Dromana, and returning much pleased with his collecting. Again, on Monday, he made an early start by coach to Bittern, and walked most of the way along the railway line to Frankston

in quest of the flora we had noted from the train on the way down, with equally good results.

The rest of our party worked the reefs for marine life, and waited patiently for the boat from Flinders, that was to take some of them out dredging ; it did not come, so unfortunately we were unable to get any specimens outside the low tide zone.

Monday.—Breakfast over at 7.30 and nearly all packing done, we set to work to make the most of our last day. Three of our most energetic mineral collectors went out for a further supply of spalls, some of which are believed to have been used for road metalling. Another party went to Shelly Beach after shells, and the rest resorted to the rocks and reefs, all the parties returning for our last camp meal at 2 p.m.; and then followed a final packing-up in readiness for the luggage trap and coach at 5 p.m.

This is a very interesting camping-ground, and much good marine work could be done here. I think that our trip will bear good results when the individual members have had time to more critically examine their collections ; but as the monthly Club meeting follows so closely on our camp-out, members have not had time to work up the material collected.

At 5 p.m. the vehicles arrived, and after loading up and being "snap-shotted," we started home. On arrival at Bittern we found that the bicycle party entrusted with the billy had not arrived, having made a slight side excursion along the Dromana road, but another was quickly unpacked, and a last attempt was made to consume the balance of our provisions. A fire was lighted, and a mug of tea all round prepared us for our train journey.

Having secured two semi-divided compartments we made ourselves comfortable, and arriving at Flinders-street half an hour late, a most pleasant outing came to an end.

I would here thank the members for their assistance in carrying out the details of the camp, and eating what little I could provide, notwithstanding frequent complaints that they were still hungry ; but there is no accounting for the action of camp life and sea air on the appetites of field naturalists.

I must also thank Mr. Mattingley for the use of his camp equipments ; and lastly, but not least, Mr. H. G. Marriott, of the Perpetual Executors and Trustees Association, for his kind permission to occupy the cottage at Shoreham.

I append brief reports from the individual members, dealing with their respective branches.—SYDNEY W. FULTON.

GENERAL.—Only two snakes, both Copper-heads, *Denisonia superba*, were seen, and of lizards about half a dozen, of three species, all common, viz., *Tiliqua nigro-lutea* (captured by the cycling party on the way down), *Hinulia quoyi*, *Liolepisma entrecasteauxii*.

The few spiders met with were common species and not numerous, with the exception of *Argiope*, whose nets were very numerous amongst the low scrub, much to the discomfort, I fear, of our "pot-hunters."

Only two frogs were noted, both *Pseudophryne semi-mar-morata*. Under logs Planarians were plentiful, but only three species were noted, viz., *Geoplana sulphurea*, *sugdeni*, and *munda*, the latter species by far the most numerous, and as a large proportion were quite young this would appear to be their breeding season, as also of the *Scolopendridæ*.

Among insects *Lepidoptera* and *Coleoptera* were not much in evidence, but as we had no entomologist with us to advise on these matters the apparent dearth of species may be due to the unpractised eye. The same remark will apply to birds, our bird men evidently reserving their energies for the Mutton-bird camp-out later this month.—S. W. FULTON.

CRUSTACEA.—The prevailing high tides and southerly winds prevented much research on the low tide zone, which afforded such good results at the Easter camp-out at Shoreham, so much so that one sand and mud bank on which we worked last time, and which was expected to give even better results under systematic digging, was under water the whole time, and could not be worked. But this disappointment was partly compensated for by the discovery of a somewhat similar patch of ground on the reef south of the pier, where Messrs. Fulton and Coghill put in an hour or two of solid manual labour, in first cutting an opening through the rock at the lower end and carrying a ditch up the centre of the flat, effectually draining it, thus enabling them to turn over the ground in search of marine treasures.

The result of this energy was the securing of a large number of specimens of *Callianassa*, a new species found at Easter, but yet to be described, which will be done on the result of some inquiries Mr. F. E. Grant is making at the British Museum, while on a visit to the old country. Several specimens of a small *Stomatopod* and a little member of the family *Leucosiidæ*, neither of which have yet been identified.

Attention was then directed to some of the shallow rock pools, when a systematic removal of all stones and seaweeds gave a good return, and two specimens of another species, not known to any of our members, evidently belonging to the sub-tribe *Thalassinidæ*, were taken.

The usual foreshore and rock haunters, *Cyclograpsus punctatus*, *Chasmagnathus quadridentatus*, *Chasmagnathus lævis*, *Utica crassimana*, *Heterograpsus octodentatus*, were plentiful. On the reefs were found *Alpheus villosus* and *A. socialis*, *Cryptodromica lateralis* (hidden in his sponge), *Lomis hirta*, *Cryptoceloma fimbriatum*, &c.; while the results of the rock pools gave several

members of the Oxyrhyncha group dressed and disguised with seaweed.

AMPHIPODA, &c.—Many of these sessile-eyed crustaceans were taken, but as none of our party knew anything of these groups, they will be handed on to those working them.

The Club meeting following so closely on the excursion, there has not been time to go into the collections in detail, or identify the result of our labours.—S. W. FULTON.

MOLLUSCA.—The previous camp-out was so strikingly successful from a conchologist's point of view that much additional material could hardly have been expected on this occasion ; still the results were good, but none of our favourite spots were at all up to their usual standard. The effect of wind and tide in sorting out and washing up shell material is strikingly illustrated in this neighbourhood, and our favourite beach, some two or three miles from Shoreham, and generally referred to as "Shelly Beach," was this time little more than a barren stretch of sand. Several of our friends might have been overheard saying—"Is this the Shelly Beach? Well, I don't think much of it," &c. In fact, some of us were looked upon as having drawn the long bow in our description of this splendid gathering ground. To these sceptics our only wish is that they may some day have the opportunity of seeing these beaches in their best attire, and then, if they are not fully satisfied, well, all I can say is they ought to be. Some of the more interesting species obtained and most worthy of note were as follows:—*Murex umbilicata*, T. Woods ; *Purpura baileyana*, T. Woods ; *Lyria mitræformis*, Lamarck ; *Cancellaria maccoyi*, Pritchard and Gatliff ; *Conus segrævi*, Gatliff ; *Adeorbis vincentiana*, Angas ; *Astræum fimbriatum*, Lamarck ; *Gibbula tiberiana*, Crosse ; *Calliostoma legrandi*, T. Woods ; *Astele subcarinata*, Swainson ; *Submarginula emarginata*, Blainville ; *Aspergillum strangei*, A. Adams.—G. B. PRITCHARD.

ECHINODERMA.—Western Port is an ideal locality for Echinoderms, the sea floor of the channels being in most parts covered with these pretty and interesting animals. But since the collecting was perforce confined to the reefs at Shoreham, owing to the fishermen, whose boat was engaged for dredging, disappointing us, the number of species collected was somewhat restricted. Since it is my intention, at some future date, to give a paper on some of the Western Port Echinoderms, I will now give but a brief *résumé* of the work done on the reefs at Shoreham during the "camp-out." The method of collecting on the reefs for Echinoderms is by turning over the rocks close to the water's edge when the tide is out. One will then find Asteroids or Common Starfish, Echinoids or Sea-eggs, Holothurians or Sea-slugs clinging to the under parts of the rocks, whilst the

Ophiuroids or Brittle Stars are usually seen wriggling in the water beneath.

Phanerozonte Asteroids were numerous, especially *Asterina gunnii*. *Asterina calcar* was rare, as was also a very small *Asterina* which so far I have not been able to identify, whilst *Pentagonaster australis* was occasionally met with.

Cryptozonte Asteroids were numerous, *Stichaster Polyplax* especially so, four-rayed varieties being not uncommon, whilst *Asterias calamaria* was well represented.

Ophiuroids were frequently met with, and much difficulty is experienced in obtaining these long-rayed animals intact, as they drop off their rays at the least interference. They were represented by two species of the order Zygophiuræ and family Ophiocomidæ.

Echinoids were also fairly plentiful under rocks, and comprised two species of the sub-class Regularia Ectobranchiata.

Holothurians were fairly numerous; some of the specimens obtained, of a creamy colour, measured 5 inches long by about 1 inch diameter. Three species were obtained, belonging to the order of Actinopoda, family Cucumariidæ.

Crinoids were not represented.—A. MATTINGLEY.

FORAMINIFERA (RECENT).—However rich this locality may be for shells of the Mollusca, the same can scarcely be said of the Foraminifera, so far as we have had an opportunity of judging. One or two samples of tide-marks were taken, and the contents worked over. Although the species are not numerous (17 in all), they present certain points of interest.

The tests of Discorbinae are by far the most numerous, and they are represented by four species. There is also a new variety of *Clavulina parisiensis*. The specimen of *Reophax* is very flexible, and the test is composed of chips of Echinus spines, coralline joints, sand grains, and smaller tests of its own ilk.

The foraminiferal shells are in some instances naturally coloured by the contained sarcode; for example, *Pulvinulina repanda*, which is of a lemon-yellow colour, and the various species of Discorbina, which have the greater part of their tests, and more especially the initial series of segments, stained of a beautiful brown-pink.

The following may be regarded as a preliminary list from this locality:—*Biloculina depressa*, d'Orbigny; *Spiroloculina nitida*, d'Orb.; *Miliolina ferussacii*, d'Orb., sp.; *M. trigonula*, Lam., sp.; *M. subrotunda*, Montagu, sp.; *M. circularis*, Born., sp.; *M. undosa*, Karrer, sp.; *Reophax scorpiurus*, Montfort; *Clavulina parisiensis*, d'Orb. (new var.); *Planorbulina mediteranensis*, d'Orb., sp.; *Discorbina rosacea*, d'Orb., sp.; *D. globularis*, d'Orb., sp.; *D. rugosa*, d'Orb., sp.; *D. vesicularis*,

Lamarck, sp. ; Pulvinulina repanda, F. & M., sp. ; Polystomella macella, F. & M., sp. ; P. crispa, Linné, sp.

Three species of Ostracoda were also found in these samples of shore sand, belonging to the genera Bairdia and Cythere.—F. CHAPMAN.

BOTANY.—The Shoreham district did not fulfil my expectations as a botanical collecting ground. *Pomaderris apetala*, *Aster argophyllus*, and *Clematis aristata* were developed in great luxuriance, but rarer specimens were conspicuous by their absence. Along the shore I found only three specimens of *Myoporum insulare*, some of *Helichrysum semipapposum*, *Daviesia latifolia* (almost over), *Mazus pumilio*, and at the mouth of the Stony Creek a few splendidly developed specimens of the ferns *Polypodium pustulatum* and *Asplenium flabellifolium*. This poor representation of wild flowers induced me to extend my searches along the Stony Creek until reaching its source, but with little better success. Near the top of the Red Hill ranges I collected *Pultenaea gunnii* and *P. daphnoides* in full bloom. In crossing the high country from the basaltic to the syenitic formation, I was struck with the sudden change in the flora, which was entirely different to that of the eastern slope. Thus *Sphærolobium vimineum*, *Goodenia ovata*, *G. pinnatifida*, *Calotis scabiosifolia*, *Sisyrinchium pulchellum*, *Prasophyllum patens*, *Thelymitra ixiodes*, *Microtis porrifolia*, and *Diuris sulphurea* were found on the sloping ground in great profusion ; while, on the other hand, *Melaleuca squarrosa*, *Viminaria denudata*, *Arthropodium strictum*, *Patersonia longiscapa*, *Casia vittata*, *C. parviflora*, and *Dianella revoluta* blended their colours harmoniously along the banks of the creek. On gaining the lower country towards the coast, close to Dromana, cultivation interfered considerably with the flora, and, finding the variety of plants exhausted, I returned to the camp, satisfied with the day's collecting

The great variety of flowers observed growing along the railway line between Frankston and Bittern made me decide to leave the camp at 8 o'clock on Monday morning, taking the coach to Bittern, from which station I walked towards Frankston, mostly botanizing along the railway reserve. Here *Helichrysum lucidum*, *Stackhousia flava*, *Leptorrhynchus squamatus*, *Xanthorrhœa minor*, *Dillwynia ericifolia*, *Euphrasia brownii*, *Goodenia elongata*, and *Linum marginale* grew to great perfection. On passing the Langwarrin station a similar change in the flora as seen on the Red Hills was observed. The appearance of such familiar plants as *Leptospermum scoparium*, *Ricinocarpus pinifolius*, *Casuarina distyla*, and others, made me aware of the fact that I was once more on sandy soil. *Drosera binata*, *Utricularia dichotoma*, *Polypompholyx tenella*, *Gnaphalium luteoalbum*, *Limnanthemum exaltatum*, and *Isotoma fluviatilis* pre-

ferred the damp soil of the drains along the embankments, while *Viminaria denudata*, *Diuris longifolia*, *D. punctata*, *Oxalis corniculata*, and *Helichrysum apiculatum* were conspicuous in the drier ground right up to the Frankston railway station, where I ended my walk and took train for Melbourne.—G. WEINDORFER.

MINERALOGY.—The mineralogists were even more successful on this occasion than on our last visit. After the experience of the former trip the party this time equipped themselves with bicycles, as the long walk home after a heavy day, and with no light load to carry, was apparently not over-relished. How far the bicycles were a success it is difficult to say, for such a chapter of accidents as befel nearly the whole of the machines it would be hard to match. Of course one might think it was the success of the expedition that was too weighty for the bicycles; but, strange to say, the majority of the mishaps occurred before loading up time in the evening. Our first point of investigation was on the ocean shore below Flinders, where certain well-developed dykes were examined, specimens of the rock and of some fine included minerals—notably good Hornblende—were obtained. Thence some of the party walked along the beach to the Older Tertiary (Eocene) Limestones, which rest on an old shingle bed derived mainly from the Older Basalt (Eocene), and put in some time at collecting fossils from this outcrop. Our next stopping place was some miles further along the coast, at the Zeolite patch. Here the superfluous energy of some of our members expended itself with great violence, and the place was scarcely recognizable by the time it had been finished with. The results were, however, highly gratifying, as some magnificent specimens of Gmelinite, Analcite, and Natrolite were obtained, some of the crystals of the former being considerably over an inch in diameter. Some very fine specimens of parallel twinning of rhombohedra, apparently of Dolomite, were also procured. All spent a most enjoyable day, and profited considerably in good typical specimens of the above and several other minerals which have been mentioned in a previous report. In fact, if one might judge by the weight of the bags that returned home that night, there was more than enough to satisfy the most exacting collector that ever existed.

The additional minerals obtained this time include Chalcedony, Agate, Flint, Göthite (?), and Steatite.—G. B. PRITCHARD.

NOTE ON THE OCCURRENCE OF MUSICAL SAND AT SHOREHAM.—As the members of the Club were traversing the Shelly Beach near Shoreham, during the recent camp-out, the peculiar phenomenon of musical sand was noticed, a distinct screech being given out when the dry sand was struck by the foot in pacing through the shifting material. It was most audible when the sand was struck sharply with the heel.

Hugh Miller, the well-known Scotch geologist, recorded a similar occurrence of musical sand in the Island of Eigg, Inner Hebrides, and he noted that it was heard at its best when there was a damp semi-coherent stratum of sand 3 or 4 inches beneath. Other well-known localities for its occurrence are those of Jebel Nakous, or the Mountain of the Bell, in Arabia, where the sand slides down a declivity and produces a sound like that of the æolian harp; Reg Rawan, near Cabul; and at Bournemouth in England.

Our president has already recorded its occurrence in Victoria (see *Naturalist*, vol. ix., 1892, p. 39) at Phillip Island, and he has stated that the sound could be detected at 40 paces—a distance which agrees very nearly with that arrived at by Hugh Miller in the Island of Eigg.

The sand at Shoreham was most musical on the dry portion, but the sound was also slightly noticeable on the damp surface, nearer the receding tide. I brought away a small sample of the musical sand from Shoreham in order that those interested may judge of this peculiar phenomenon for themselves.

Several theories have been suggested to explain this curious property in certain sands, one by Carus Wilson being that the sound is due to evenness and cleanness of grain.

Under the microscope the musical sand of Shoreham is seen to consist principally of quartz grains. Many other adventitious particles are present, such as calcareous organic fragments, corallines, Echini spines, and shell fragments, but these are in very small proportion.

The present sample does not support Carus Wilson's theory regarding the evenness of grain, for the quartz granules are of many different sizes, varying from .16 to 2 mm. in diameter, the limit ratio being about 1 to 12. Further, the degree of rounding in the grains is not an essential factor in this instance, since some of the particles are sharply angular and others are wind-polished, and between which every gradation may be found. The quartz granules are presumably derived, as is the sand of the dunes, from the gritty Tertiary strata covering a large portion of the Promontory, which in turn have been supplied with material from the decomposition of the granite, such as that of Phillip Island opposite. Particles of secondary quartz are present, but are few and far between; chalcedonic and jaspery particles are, however, not uncommon.—F. CHAPMAN.

IN connection with the Melbourne session of the Australasian Ornithologists' Union, several of the members and their friends spent the last week of November at the Mutton-bird rookeries at Phillip Island, in order to see the wonderful sight of the arrival of the birds, and otherwise study their habits.

SOME NOTES ON NIGERIA.

BY A. D. HARDY.

(Read before the Field Naturalists' Club of Victoria, 17th Nov., 1902.)

(ABSTRACT.)

THE Niger, which rises near Sierra Leone and flows towards the Saharan desert, turns near Timbuctu, and flows south-east and south towards the Gulf of Guinea, finally bifurcating and ramifying into a labyrinth of channels through the great mud flats of the delta. The deltaic area measures about 200 miles from apex to coast, and has a sea frontage of about 250 miles. Further to the east the country is drained by two rivers, the Cross and the Calabar, which have no known connection with the Niger, and reach the Bight of Biafra by a common estuary. On each side of the estuary, which is 10 miles wide at its mouth, numerous creeks and ana-branches reticulate the mud reaches. As in the Niger delta, these mud flats are covered with mangroves. The junction of the Cross and Calabar Rivers is about 60 miles from the sea, and at a few miles up the Calabar (lat. $4\frac{1}{2}$ deg. N.) is situated Duketown, which has a population, comprising Efik negroes, of about 8,000 or 10,000, and about 90 white men.

The vegetation of the low-lying tracts is chiefly mangrove scrub and palms. Of the mangrove there are two species, viz., *Rhizophora racemosa* and *R. mangle*. The peculiarities of the mangroves are pretty well known. The spreading, much-exposed roots, and the germination of the seed while the fruit is still attached to the tree, being common to most of the species. These mangrove and mud areas are a paradise for the Crocodiles, *Crocodilus niloticus*, some of which I estimated to be over 15 feet in length.

Further up the rivers, practically out of tidal influence, Hippopotami may be found, but I have seen no more than their clumsy-looking snouts above the water at a distance.

Several species of Monkey, mostly small, climb and chatter in the scrub. Monkey flesh is commonly sold in the native markets, and has nothing objectionable about it in taste when stewed in palm oil. One species, less common, is a brown animal, standing on all fours about 2 feet high. The head and forearms black; tail long and non-prehensile.

A large dipterous insect resembling a huge blue-bottle haunts the mangrove scrub, and has, in common with our March-fly, a silent flight. It inflicts a bite which causes some days of pain and discomfort.

One species of fish specially interesting is to be found skipping about on the mud or resting high, and almost dry, on a snag or mangrove root. Length, 4 to 5 inches; colour, mottled brown, with

metallic-blue spangles. It has a large, clumsy-looking head, and the body tapers evenly to the tip of the tail. Near the gills there are two limbs with muscular development, and fan-shaped finned extremities. The fish uses these fins and tail to skip along the mud banks and climb the mangrove roots. The eyes are situated on the top of the head, are very prominent, can be moved to view all points of the compass, and have movable eyelids. The pupil of the eye is black, and the iris bright red. The fish can depress these eyes until they are at same level as the top of its head. The creature seems like a link between fishes and amphibians, and is known to science as *Periophthalmus*, because of the peculiar eyes. Sometimes it raises itself on its "elbows" to get a better view. The "mud-skipper" of the North Australian coast are probably allied species.

The Grey Kingfishers here are protected by native "ju-ju," or fetish worship, and are plentiful.

Leaving the river-side and entering the country to the east, which rises interiorly, the typical African bush comes into view, and is, in general appearance, a dense, impenetrable thicket of various flowering plants, relieved here and there with palms and occasional tall trees.

Of the palms, three are conspicuous and important. The Oil Palm, *Elais guineensis*, grows only in this part of the world. It resembles the Cocoanut Palm, and grows to a height of 80 feet or more. One tree yields about 20 lbs. of nuts in a season. The nuts give nearly half their weight in oil. Two crops are taken, one in the dry season and the other during the rains. The ripe fruit—consisting of a pulp, fibrous and orange-coloured on outside, and containing a dark-skinned, white kernel—is about the size of a walnut, and droops in bunches several pounds in weight from the centre of the crown of pinnate leaves. The pulp is separated from the kernels and boiled, and the oil, which rises to the surface, skimmed off and sent to the traders. The kernels also yield a good oil when crushed, heated, and pressed.

Two other palms are species of *Raphia*. *R. Hookeri*, known locally as the Ukot, has a matured height of 70 or 80 feet. The sap, extracted by the natives, is of milky appearance, and tastes, when fresh, like cocoanut milk, but when fermented is sour, and becomes a powerful stimulant, called mimbo, or palm wine.

The third palm of the three selected for reference is the Bamboo Palm, *R. vinifera*. The mid-ribs of the leaves are used for hut building, the leaves for thatching, and the pinnules—when stripped of the cellular epiderm—yield an excellent fibre for mat and native cloth making. This species is short-stemmed.

A bird which resembles a small brown thrush cleverly ties its nest to the pinnules of the tall palms, and even the force of a tornado fails to dislodge it, though the palm may be bent until

the leaves touch the ground. The Palm-birds congregate like sparrows, and make a great chattering.

A tree which towers above the thicket is the Kapok, or Silk-wool tree, *Eriodendron anfractuosum*. It grows to about 100 feet, with thick, straight trunk, and horizontal, whorled branches. The seed-pods are very numerous, and supply the kapok of commerce, which is the silky hair in which the seeds are embedded.

Another plant peculiar to Nigeria is the Ordeal or Calabar Bean, *Physistigma venenosum*, a leguminous climber, reaching a height of 30 or 40 feet. The brown beans—of which a few are exhibited—are used by the “witch doctors” in preparing a poison-drink by which they are popularly supposed to ascertain the guilt or innocence of accused persons. A small quantity causes convulsions, paralysis, and finally death, but an overdose acts as an emetic. The accused’s only chance of innocence is by “tipping” the witch-doctor to obtain an overdose. The Calabar Bean is also used in ophthalmic surgery, the effect being the reverse of that of belladonna.

(To be continued.)

NATURAL HISTORY NOTES FROM THE MALLEE.

BY J. C. GOUDIE.

DURING a recent trip into the Mallee, north-west from Birchip, and near the route of the Birchip-Mildura railway, now in course of construction, I had opportunities of making a few observations on the natural history of that locality. The country thereabout is rather of a superior description, being of a sandy nature, and in spite of the prolonged drought many of the crops were looking well. Sand ridges, clothed with splendid belts of Murray Pine, are a conspicuous feature. On the way up numbers of Emus were seen sedately walking the plains, or at intervals treating us to a display of their sprinting powers. On all sides, we were told, the Kangaroos and Emus were leaving the mallee and making for the open country on account of the scarcity of water. Were it not for the *Game Act* there would probably be a great slaughter, as in their weakened condition they fall an easy prey to dog and gun. The first thing one noticed in walking over the sand-hills was the vast numbers of ants’ holes to be seen, the ground often for three or four acres in extent being completely riddled. Very little of the excavated earth was visible, the tops of the holes being flush with the surface, quite round, and appearing as if made with a gardener’s “dibble.” They vary from an inch to about 3 inches in diameter, slightly wider at the top, and about 6 or 8 inches in depth, branching at the bottom into lateral

galleries. The ant which makes them is $\frac{1}{4}$ -inch long, of a pale brownish colour, and very sluggish in its movements. Another shining black species builds a clay or earthen enclosure several inches in height round the stems of a small shrub; these have the entrance hole at the side, about 2 inches from the top. The number of species of ants in the Mallee is legion, and a fine field awaits the systematist and observer in the Formicidæ of Australia. In places where the pink mallee grew (so called from the colour of the wood) little piles of sawdust-like material round the butts indicated the presence of borers, and a few strokes with an axe brought to view a number of very large Buprestid larvæ, probably of *Stigmodera heros*, a fine insect—the largest, I think, of the Victorian Buprestidæ. In the proper season the perfect beetles must be quite plentiful, and a collector paying a visit about the end of December or January would probably secure a good many specimens. A few larvæ were also found of the rare Longicorn, *Microtragus mormon*, Pasc, a brown or drab-coloured beetle about an inch in length, which has a curious superficial resemblance to some of the ground Curculios of the genus *Sclerorrhinus*. The life-history of this species is interesting, and does not appear to have been recorded. The grubs feed in fallen dead timber, generally preferring the kind known as black mallee, always confining themselves to the under side of the log, and at a place where it rests on or is partly buried in the soil. If the wood is a little decayed so much the better; they appear to be slow feeders, and do not make long tunnels, differing widely in this respect from many others of the Cerambycidæ. When full-grown the grubs, which are about an inch and a half long, somewhat cylindrical, and yellowish-white in colour, come right out of their tunnel and construct a firm, compact oval cocoon, composed of gnawed wood and particles of sand, &c. This cocoon is generally quite detached and buried in the soil, rarely being attached to the under side of log. The beetles emerge from about the end of November to February, often remaining in the cocoon several weeks in the perfect state.

As the time of our visit (end of August) was too early for most insects, we did not expect to find many, but later on in the season I think it should prove a first-rate collecting ground, as there is any amount of scrub of a kind that insects like. A few of the commoner beetles, such as *Steropus*, *Simodontus*, *Saragus*, *Adelium*, *Pempsamacra*, &c., were met with, and several specimens of a rather good Longicorn (*Uracanthus*, sp.) were taken in their tunnels in the branches of an *Acacia* (*A. hakeoides*). Remains of a *Cetonia* like *Diaphonia dorsalis*, but minus the black dorsal mark, were also found. Lepidoptera were exceedingly scarce, *Holochila erinus* (bright variety) and *Pyrameis kershawi*, being the only butterflies, while the moths were represented by a

couple of Geometers, *Selidosema argoplaca* and *S. cognata*, the ever common *Taxeotis isophanes*, and a few of the pretty little *Æcophora polychroa*. A peculiar-looking hymenopterous insect belonging to the Evaniidæ was often seen resting on trees with its minute abdomen held up at the end of a long petiole, while on sunny days numbers of brown and red dragon-flies darted to and fro amongst the spinifex.

Of birds there was a fairly good muster, but mostly of the species enumerated in the list of Birchip birds published in the *Naturalist* a few years ago. Occasionally, however, a flock of Black-tailed Parrakeets would fly past. Red-backed and Barnard's were very numerous, and one of the latter, a male, showed a divergence from typical specimens in having the whole of the top of the head of a bright yellow colour, matching the yellow breast-band; in other respects the plumage was normal. I was sorry I had not a gun at the time, as it was one of those occasions when a bird in the hand is worth quite a number in the bush. Round about our camp a flock of about a dozen Pink Cockatoos were often in evidence, and making a great show of cleaning out hollows for nesting purposes. Chestnut-backed Ground-Thrush, Bronze-winged Pigeon, and Peaceful Doves were plentiful, and a few Scrub-Robins were seen, but no nests found. In the course of our rambles we came across a good many Mallee Hens' nests, but the birds were not working; they never do so until a fall of rain occurs, so that the material is wet when scraped into the mound. If one wishes to see them at the nest he must approach with extreme caution against the wind, as at the least noise they rush away into the scrub. In observing the habits of the different birds as they came under notice, we often remarked the similarity between the actions of some of the smaller Honey-eaters and the Tree-creepers and Sitellas. The Graceful and White-eared especially seemed to pass most of the time hunting for insects under the bark of trees, performing various gymnastic feats with apparent ease, and evidently quite "up to" the tree-creeping business in all its branches. Speculation flits through the observer's mind as to whether Darwin could have told us of a Honey-eater with true scansorial feet, which ate the nectar from blossoms, and made its nest in hollow trees.

A remarkable fact was the almost entire absence of raptorial birds, one specimen each of Wedge-tailed Eagle, Brown Hawk, and Goshawk being the only ones seen in the Mallee; but in the open country bordering the plains they were more numerous, dead sheep and lambs doubtless being the attraction.

Of reptiles, a young Brown Snake, Blue-tongued Lizard, Jew Lizard, and a species of Gecko found under the bark of trees may be mentioned.

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 8th December, 1902. The president, Mr. T. S. Hall, M.A., occupied the chair, and about 45 members and visitors were present.

REPORTS.

A report of the Club excursion to Cheltenham on Saturday, 22nd November, was given by Mr. C. French, jun. The members divided into two sections, one for pond life and the other for general collecting. The latter went in the direction of Oakleigh, and noted altogether about 25 species of plants in flower, among which were *Drosera binata* (plentiful); the orchid *Cryptostylis longifolia*, in bud, some plants being taken for home cultivation; *Xyris gracilis*, *Epacris obtusifolia* (some of which were fully 7 feet high); *Viminaria denudata* and *Epilobium glabellum*. On the leaves of the orchid *Cryptostylis longifolia* was found a fungus, which, on being submitted to Mr. D. M'Alpine, was found to be new to science, and will shortly be described in the *Naturalist*. Several species of scale-insects, Coccids, were collected, one species in particular, *Aspidiotus bossiæ*, being fairly plentiful. A pair of Blue-tongue Lizards *Tiliqua nigrolutea*, Gray (?), were met with, and on the male some large ticks, a species of *Ixodes*, were found and bottled. Beetles were scarce, only a few common species of Buprestidæ being captured.

Mr. W. Strickland reported that those members who devoted the afternoon to pond life were unfortunate in discovering but little water in which to prosecute their search, while the material collected was not very rich in life. Even the Entomostraca were scarce, while the few Rotifers noted were all of common species. The chlorophyll-bearing Vorticella, of which specimens were obtained in this district several years ago, was, however, found again, but the most interesting animal form was one of the Testaceous Rhizopods, *Lecqueureusia* (sp.), which was altogether new to those present. Among the more interesting Desmids noted were *Micrasterias denticulata*, *Doeidium nodosum* (being new to those present), and species of *Spirotænia* and *Tetmemarus*.

The hon. librarian reported the receipt of the following donations to the library:—"Fungus Diseases of Fruit Trees," by D. M'Alpine, Government Vegetable Pathologist, from the

Department of Agriculture, Victoria; "Year-Book of Western Australia," 1900-1, vol. i., from the Western Australian Government; *Nature Notes*, November, 1902, from the Selborne Society, London; *Knowledge*, November, 1902, from the proprietors; also a number of parts of proceedings, &c., of American scientific societies, through the Smithsonian Institution, Washington.

ELECTION OF MEMBERS.

On a ballot being taken, Messrs. H. Summers, Working Men's College, Melbourne; Frank Madden, M.L.A., Studley Park, Kew; Alan S. Johnston, "Willesden," Chapel-street, St. Kilda; and J. A. Leach, 151 Richardson-street, Middle Park, were elected as ordinary members; and Mr. Fredk. J. Cayley, Outtrim, as a country member of the Club.

PAPERS.

1. By Mr. D. Goudie, entitled "Larvæ and Pupæ of Birchip Heterocera," part ii. In this paper, which was of a technical character, the author described the different stages, together with the food-plant, of *Destolmia lanceolata*, Walk., a moth which has also been taken, as well as the larva, within a few miles of Melbourne.

2. By Mr. F. L. Billingham, entitled "Curious Effect of the Bite of Certain Ants." The author described the effect he personally experienced from the bites of a species of ant, described as the "jumping ant," the scientific name of which was unknown to him. Shortly after being bitten he was seized with a fit of vomiting, and within a few minutes he had another and more violent attack, after which he fell down unconscious, in which state he remained for over half an hour. After coming to a red rash developed itself, which lasted only a short time, and in a couple of hours he was well again. The author stated that he afterwards ascertained that two young men, residents of the same district (Taggerty), had experienced exactly the same symptoms, one being unconscious for three hours.

The paper was discussed by several of the members present, none of whom had, however, heard of a similar case.

3. By Mr. G. Weindorfer, entitled "On the Fertilization of Phanerogams—Part 2: Dispersion of Pollen by Insects." This paper, which was a continuation of one read at the October meeting of the Club, dealing with the dispersion of pollen by the wind, excited some discussion, Messrs. O. A. Sayce, J. F. Haase, F. G. A. Barnard, the President, and others taking part.

NATURAL HISTORY NOTES.

Mr. F. G. A. Barnard called attention to his exhibit of a plant of the fern *Asplenium bulbiferum*, G. Forster, collected at the Mathinna Falls in December, 1900, on the surface of the fronds

of which several young plants had appeared, a circumstance which he had not before noticed in Victorian specimens of this fern.

He also drew attention to an abnormal growth of a rose, in which the stem of the rose is continued from the centre of the flower for several inches beyond the ring of petals, and bears several leaves.

Mr. G. A. Keartland mentioned an exhibit by him of the eggs of five species of honey-eaters and a bower-bird, two of which, the Yellow-backed Honey-eater, *Melithreptus laetior*, and the Guttated Bower-bird, *Chlamydodora guttata*, being the type specimens.

Mr. G. A. Pritchard remarked on the abnormal growth of two species of shells, the common Mussel and the common Cockle, which he exhibited, one valve of which was very much smaller than the other.

Mr. J. A. Kershaw, F.E.S., drew attention to an exhibit by the National Museum of a rare species of burrowing frog, which had been recently received by the Museum, and which Professor Spencer identified as *Philocoryphus flavoguttatus*, Fl. The specimen, which was a male, was captured at Tongio West, East Gippsland, Victoria, and is the first recorded specimen from this State, previously recorded only from New South Wales. This species is peculiar in having its first, second, and third fingers furnished with several black, horny, acute tubercles, one of which, on the first finger, being much larger than the others.

He also mentioned a recent capture at Port Fairy of a Basking Shark, *Cetorhinus maximus*, Gunn, which he had been able to examine. The specimen was a male, and similar in every respect to the specimen described and figured by him in the August number of the *Naturalist*, xix., page 62, though much shorter. As this specimen had not been previously opened, he was able to secure a sample of the food from the intestines, as well as to observe the peculiar whalebone-like gill-rakers, which had been removed from the previous specimen before reaching the Museum.

Mr. A. Coles also made some remarks on the same specimen, particularly with regard to the gill-rakers, which he had observed while stuffing it.

Mr. A. J. Campbell remarked on a large double-yolked egg of the Mutton-bird which was exhibited by Mr. J. Gabriel.

EXHIBITS.

By Mr. F. G. A. Barnard. —Growing Victorian ferns—*Ophioglossum vulgatum*, collected on Sandringham excursion, July, 1902; *Asplenium bulbiferum*, collected at Mathinna Falls, on Healesville excursion, November, 1900; also abnormal growth of rose.

By Mr. A. G. Campbell.—Some typical rocks from King Island, Bass Strait:—Plutonic—(1) Granitoid mixture of sanidine amphibole, quartz, and biotite; (2) Granite, with crystals of tourmaline; (3) Aplite, showing crystals of tourmaline; (4) Gisen; (5) Gabbro; (6) fine-grained (?) Dyke-rock; (7) Gneiss, showing characteristic rugged weathering. Organic—(8) Dune Limestone and Granite Sand, with comminuted shell from which it is formed; (9) Crystalline Limestone. Also skins of four species of Maluri—*Malurus cyanocephalus*, Queensland; *M. cyaneus*, New South Wales and Victoria; *M. gouldi*, Tasmania; and *M. elizabethæ*, King Island.

By Mr. A. Coles.—Common Sparrow, *Passer domesticus*, albino, shot at South Melbourne; and clutch of eggs of King Quail, *Excalfactoria lineata*.

By Mr. St. Eloy D'Alton.—Rare Victorian lizard, *Tiliqua occipitalis*, Peters (alive).

By Mr. J. Gabriel.—Abnormally large egg of Mutton-bird, *Puffinus tenuirostris*, Temm.

By Mr. G. A. Keartland.—Eggs of *Chlamydodera guttata* (type), *Melithreptus latior* (type), *Myzomela pectoralis*, *M. nigra*, *M. erythrocephala*, and *M. sanguinolenta*.

By Mr. J. A. Kershaw, for National Museum.—Frog, *Philocryphus flavoguttatus*, Fl. (male), locality Tongio West, Victoria, first time recorded from Victoria.

By A. Mattingley.—Dry Sponges from the Nobbys, Phillip Island.

By J. T. Paul.—Six species of flowering plants, including *Cryptostylis longifolia*, *Lomatia ilicifolia*, &c., from Grantville.

By G. B. Pritchard.—Abnormal growths of common Mussel and common Cockle.

By Mr. F. M. Reader.—Dried plants from Wimmera—*Lamium amplexicaule*, L., *Bromus mairitensis*, L., naturalized, both new for Victoria; *Lepidosperma lineare*, R. Br., new for N.W. of Victoria; *Centrolepis cephaliformis*, n. sp.; also medical plants from North America—*Polygala senega*, L., *Podophyllum peltatum*, L., *Hamamelis virginica*, L., *Hydrastis canadensis*, L.

After the usual conversazione, the meeting terminated.

EXCURSION TO BACCHUS MARSH.

THE members who met at Spencer-street on the morning of Cup Day, 4th November, were few but enthusiastic, and, notwithstanding the promised hot wind, were prepared to carry out the 10-mile walk suggested in the monthly notice paper. However, acting on the advice of the leader (Mr. C. C. Brittlebank), conveyed to one of the party some days before, it was determined to take the coach from Bacchus Marsh to Myrniong (Pentland

Hills), where we were heartily welcomed by the leader and his family. During the railway journey we got numerous glimpses of flowers along the line, principally composites, but what species we were unable to determine. After luncheon at "Dunbar," the leader said, as the visitors were more inclined to botany than geology, that a visit to the Lerderderg Ranges would be more productive of flowers than the Werribee Gorge, and offered to drive us thither, which we gladly accepted, as the day was rather hot for walking. So, taking our seats in our host's buggy, we were soon on the way to the ranges. Passing several fertile farms and over some well-grassed paddocks, we soon reached the Korkuperimul Creek, where we left the buggy and any extra impedimenta for the present, and prepared for some hard work. Striking up a little valley, we found everything very dry. Numerous leguminaceous shrubs, such as *Pultencea daphnoides*, *Daviesia corymbosa*, and *Acacia armata*, were bearing their burdens of seed-pods. As we ascended we did a little better. *Helichrysum obcordatum* was noted, and presently what was at first glance thought to be a *Styphelia*, but turned out to be *Brachyloma daphnoides*. Another dwarf shrub obtained was *Trachymene billardieri*, belonging to the Umbelliferae, but it was not quite in flower. As we neared the crest of the range, a very stony hill was ascended—a very unlikely place for orchids, one would say; but here *Pterostylis rufa* grew in abundance, several plants being found with three and four blooms on the stem. *Diuris longifolia* was also noticed, and a pretty little *Veronica*, *V. calycina*, was common among the stones. Arrived at the top we found an extensive valley spread out before us, the sides covered with a thick growth of scrubby Eucalypts, &c., principally *E. leucocylon* and *E. behriana*, with the Lerderderg River about 1,300 feet below. The descent was somewhat rough, as the hillside was composed of loose, thin flakes of stone, the result of the weathering of the Silurian rocks. However, after numerous slips and slides, we got down to firmer ground, and finally reached the river some three or four miles above the site of the "camp-out" in 1899. Numerous flowering shrubs attracted our attention here, and while some bathed, others rambled about and secured specimens of *Aster stellulatus*, *Clematis aristata*, *Veronica perfoliata*, *V. derwentia*, *Myoporum viscosum*, *Prostanthera nivea*, *P. rotundifolia*, *Beyeria viscosa*, *Acacia decurrens*, *Helichrysum lucidum*, &c. A young Eucalyptus, apparently *E. globulus*, afforded some extremely long leaves, one of which measured 14 inches along the mid-rib. But we could not stay too long, as that 1,300-foot hill had to be climbed ere we could reach our buggy, so, shouldering our specimens, we found an old gold-miner's track, which zig-zagged up a spur, and in time reached the top, on the way adding *Euphrasia brownii* (stunted specimens) and *Eucalyptus melliodora* to our collections. Arrived

on the top additional plants such as *Pultenaea mollis*, *Eutaxia impetrifolia*, and *Grevillea alpina* were added to our list. After struggling through a thick growth of dwarf gums, &c., we at length reached our vehicle, and were soon back at "Dunbar," where Mrs. Brittlebank had prepared a meal suited to the wants of hungry naturalists. After tea there was little time to chat before the conveyance which was to take us back to Bacchus Marsh (eight miles) arrived, and we were soon *en route* for the station, and in due course reached Melbourne again about 10.30 p.m., well pleased with our trip, though at one time rather inconvenienced by the heat. Insects were very scarce all day. Altogether between 40 and 50 species of plants were noticed in bloom, and the resemblance of the flora to that recorded in the report of the Gisborne excursion (*Vict. Nat.*, xvi., page 146) was very noticeable; but it must be borne in mind that the same barren Silurian formation extends right across almost to that place, a distance of some 12 or 14 miles.—F. G. A. BARNARD.

SOME NOTES ON NIGERIA.

BY A. D. HARDY.

(Read before the Field Naturalists' Club of Victoria, 17th Nov., 1902.)

(Concluded from page 118.)

The Crab's-eye Bean, *Abrus precatorius*, growing here, is also to be found in Queensland, the beautifully-coloured red and black seeds being used as ornamental pin-heads.

Thevetia nerifolia is a fine shrub, about 10 feet in height, having bunches of long lace-like leaves, and large yellow, trumpet-shaped flowers. It is interesting, when a *Thevetia* in bloom has attracted a species of Humming-bird, to watch these tiny creatures buzzing rather than flying, and, whilst on the wing, thrusting their long, curved bills through the corolla tubes to suck the hidden sweets.

Rubber, one of the chief products of the country, is obtained from species of *Ficus*, *Landolphia*, and *Kicksia*. Allied species of *Ficus* grow in Queensland, and are well known. The *Landolphia* is a strong twining plant, and the *Kicksia* somewhat resembles an Orange tree, and grows to 20 feet in height. The presence of rubber trees in this locality was discovered through the natives using the semi-coagulated sap as bird-lime.

In gathering rubber the natives slit the bark, and—in case of *Landolphia*, the sap of which rapidly coagulates—smear their bodies with the milk as it exudes. The plaster is then peeled off and rolled into balls for the traders, who export it for special treatment.

The Kola-nut tree, *Cola acuminata*, grows plentifully in North

Guinea. Matured height, 20 feet. The brown-skinned kernels of the nuts are white or reddish-coloured, and have stimulating properties, for which they are used in adulterating cocoa, tonics, &c. The Kola-nut is as inseparable from the West African as the Betel-nut from the East Indian and Javanese. The negro can go on a long day's march with no other food than a Kola-nut, and he also cuts from the root a thin, flat lath, the end of which he sucks and chews in order to keep his teeth white and his breath sweet.

One of the chief native foods is Cassava, the tuberous root of *Manihot utilissima*. The poisonous juice is expelled by squeezing, and the residue pulped and eaten. The principal yam grown for food is *Dioscorea acul-ata*.

Of insects, myriads, belonging to the orders Coleoptera, Hymenoptera, and Lepidoptera, may be encountered. Worthy of special note among the Coleoptera is the Winnebago Beetle, *Goliathus giganteus*, of which a natural size and coloured sketch from life is exhibited, and the small brown, narrow beetle, of which several specimens are exhibited. The latter is the West African Fire-fly. The flashes of electric-blue light are emitted from the white patch which will be seen on the lower surface of the posterior abdominal segments. The light is so strong that, having had occasion to consult a chart at night, I have improvised a lantern with satisfactory results by placing one of these insects in the fold of a silk handkerchief.

The large black ant exhibited is not so graceful as the red Bulldog Ant of Victoria, of which I exhibit a specimen for comparison. This is the Driver Ant, which marches in columns several inches broad, with guards thrown out on either flank. They do not pass each other, but all march in one direction, the guards falling in with the retreating column at the end of the night's foraging.

There are many Snakes, varying from 12 inches in length to large Pythons.

Of Lizards, two are noted. One of these, about 6 to 9 inches long, and vari-coloured, climbs actively and in large numbers about the trunks of the Kapok trees. The other resembles a small snake, being without legs and of almost even diameter of $\frac{1}{3}$ inch throughout, 12 inches in length. It answers to the description of *Anguis fragilis*, having almost imperceptible eyes and mouth. In colour it is of silvery-blue, and is very active in habit, gliding swiftly among grass and dead leaves, and, when attacked, writhing in marvellous contortions, like an injured worm.

Want of space precludes a description of a great many other forms of faunal and floral life; but, in conclusion, the following note on the climate may prove interesting.

The year is divided into rainy season and dry season. In the

dry season is the highest temperature, which does not exceed 95 deg. Fahr., and in some of those months there is no rain. In the rainy season as much as 20 inches fall in one month, 5 inches having been registered in 24 hours. The lowest temperature is 68 or 70 deg. F. The death rate for Europeans, chiefly through malaria and other climatic causes, varies from 5 to 25 per cent. of the population.

ON THE FERTILIZATION OF PHANEROGAMS.

II.—DISPERSION OF POLLEN BY INSECTS.

By G. WEINDORFER.

(*Read before the Field Naturalists' Club of Victoria, 9th December, 1902.*)

IN my previous paper I spoke of the fertilization of flowers through the agency of the wind. I purpose now giving some account of the part insects play in effecting the same object.

Now, the male and female cells, or the organs which produce them, arise either close to one another or at a distance on the same plant, or they may arise on different individuals of the same species; the sexual cells of the same species of plant may thus, according to their origin, be more or less closely related, behaving towards one another as sister cells, as cousins, or as their grandchildren and great-grandchildren, and so on.

When in one and the same flower, the organs in which the pollen and those in which the ovules are developed stand closely side by side; it might be thought, therefore, that the pollen would be certain to reach the adjoining stigma, but this opinion is not confirmed by experience. It has been demonstrated that it is of advantage to the plant that the pollen of one flower should reach the stigma of another—indeed, of a flower of quite another plant, often some distance away. The wonderful and extremely complicated contrivances which are met with for the attainment of the dispersion of the pollen by means of insects will be partly considered in to-night's paper.

Contemporaneously with the opening of the earliest spring flowers occurs the escape of the first pioneer butterflies from their chrysalides, and the same sunny day which rouses hive bees and humble bees from their winter sleep sees the flowers offering their pollen and honey to the world at large. Many flowers which open early in the morning are visited only by particular insects which leave their nocturnal haunts at the same hour. Other flowers do not open till sunset, when day-flying insects are already gone to rest and they are visited by others, which have remained throughout the day concealed in shady nooks and commence their rambling when dusk sets in.

Now, first of all the question arises: what is it that induces

insects to visit flowers, and what advantage accrues to a plant from the visits with which its flowers are favoured? The answer is, that the inducement is in some cases care of young, in others the desirability of securing themselves against dangers from storms, and most commonly of all it is the craving for food. Flowers, however, do not provide animals with breeding-places, with temporary shelter or suitable nutriment without claiming a reciprocal service, but have their parts so adjusted that their visitors become laden with pollen, which is then transported to other flowers and deposited on their stigmas, where it initiates a series of changes resulting in the setting of the seed.

The efficacy of all the arrangements for promoting the quick and easy obtaining of food from flowers by bidden guests is obviously much enhanced by the existence of others for the exclusion of hurtful and undesired visitants. As hurtful may be characterized all such animals whose visits interfere with or prevent the speedy transfer of the pollen from flower to flower. Such are small wingless animals, which must of necessity reach the honey and pollen on foot. Suppose such a little pedestrian has reached a flower and covered itself with pollen; it has now, in order to transfer this pollen to a stigma on another plant, a long and toilsome journey, beset with dangers to the pollen, quite apart from the length of time taken. Shortly, the pollen may be easily rubbed off on the journey, or it may be washed off by the rain. How otherwise it is with the lightly-flying insects. They dart from plant to plant with extraordinary rapidity and visit half a dozen flowers within a minute or so, thus transferring the pollen new and fresh. Winged insects are therefore in the most cases ideal agents for the crossing of flowers, and are the most welcomed of all guests.

The simplest case, where insects after reaching the flowers are covered with the pollen, is that where the insects rove and climb about the flowers and so get powdered all over with pollen. This happens in innumerable plants which, owing to the association of large numbers of flowers in umbels, fascicles, spikes, and capitula, afford a playground, richly furnished with slender waving stamens, where pollen is easily to be shaken or brushed off the anthers on every hand, although each single blossom only contains a few stamens.

Remarkable is the fact that insects after being imprisoned for a time in the flower of *Aristolochia clematitis* are quite covered with pollen when they emerge. The way into the enlarged base of the flower is over a convenient ligulate alighting place and through a dark and comparatively narrow passage lined with hairs. The free extremities of these hairs point inward, and permit visitors from the insect world, small black midges, to pass into the chamber. Not uncommonly 6 to 10 such flies may be

found in a flower. They are imprisoned, and cannot escape, because, as mentioned, the throat of the flower is beset like a trap with long motile hairs, which bar the passage out as in a weir basket. While the insect is thus wandering around the cavity it brings its pollen-laden back in contact with the stigmatic surface and pollinates it. As soon as this has taken place, the anthers, which have been closed hitherto, dehisce and become freely accessible at the same time by the change in the stigma. About this time the hairs in the narrow passage wither and collapse, leaving a free exit, and the midges, all be-powdered with pollen, hasten to leave the flowers. That they retain no unpleasant recollection of their temporary confinement may be inferred from the fact that they have no sooner escaped from one flower than they creep into another.

It may be mentioned that so long as the stigma is still receptive, the perianth opens outwards, presenting to the flies a hospitably open door; but as soon as they have accomplished the pollination of the stigma, and when the flies, again laden with pollen, have flown away from the flower, the banner-like lobe of the corolla closes over the mouth of the throat, stopping the entrance to the flies, which have now nothing more to do here. In fact, it were a contradiction for the invited guests on their arrival that a flower should remain widely open when no more nourishment was to be obtained—when the meal, so to speak, was finished. When this is the case it is undesirable that they should interfere with the other younger flowers by competing with them for visitors.

In very many of the Papilionaceæ the two lateral petals, called wings, converge towards their upper margins, along which they are in contact, so that they form a convex saddle, arching over the keel. The wings and keel are locked together, and every pressure upon the pair of wings is transmitted to the keel, in which are the anthers. Consequently when an insect sets itself astride on the saddle-ridge formed by the wings, not only is the latter pressed down but also the keel, and this movement is accompanied by the extrusion of a pasty vermicular mass of pollen, and by the simultaneous adhesion of the pollen to the insect's belly, or sometimes to its legs. In this case the action of the stamens within the cavity is just the same as that of the piston inside a pump, and has therefore been called "pump apparatus," which appears to be confined to papilionaceous flowers only.

The mechanism to be described next does its work by means of impact, and performs the movement of the filaments resembling the striking of a hammer. The best known examples of the hammer form of mechanism occur in the genus *Salvia*. The under lip of this labiate flower serves as a landing stage for the

humble bees to alight on. On either side of the entrance to the back part of the flower, in which the honey is hidden, is a stamen, composed of a short, erect, firm, and immobile filament and an anther borne at the extremity of a much elongated and slightly curved connective which rocks at the top of the filament. This part of the stamen, which is liable to be set rocking, is a curved lever, consisting of two arms of unequal length. When a humble bee pushes the lower arm, which is the shorter one, in the direction towards the interior of the flower, the upper arm drops and the anthers fall upon the insect's back, which is consequently covered with pollen. The bees laden in this manner rub the pollen off on to the deflexed stigmas of the flowers they subsequently visit.

The number of contrivances by means of which pollen is distributed by insects is very large, and I must therefore confine myself to an account of the most curious forms. It remains still to speak about the apparatus of the explosive variety, which is adapted to besprinkle insects with pollen.

In the case of *Crucianella stylosa*, which flowers are conglomerated in terminal heads, the style is twisted into a spiral, and the thick stigma at the top of it is wedged between the anthers. The moment the anthers open the pollen pours out and rests upon the papillose surface of the stigma. Soon afterwards the style elongates, with its coating of pollen, until it comes against the dome-shaped top of the closed corolla, where its further ascent is stopped. At this stage of development the style is in a condition of such extreme tension that when the limb of the corolla opens it springs up, scattering a cloud of pollen from the surface of the stigma. A sudden opening of the corolla can be caused if a small bee or fly chances to touch the top of a closed flower on its way to visit an open one, and involuntarily the insect is then dusted with pollen from below—a state of affairs not always agreeable to them. At the same time it cannot be very disagreeable, for the animals may be seen, immediately after flying off the pollen-strewing flowers as if frightened, visiting flowers of the same species in the next moment, where they will experience the same treatment. It would indeed be strange if the same flowers should on the one hand have such contrivances as will allure insects in order that they may transfer the pollen from plant to plant, and on the other hand be so arranged as to shock these laden and attracted guests, and disincline them to further visits. Such a contradiction never does occur in the flower world, but all the contrivances connected with the transference of pollen display a harmony which fills those who busy themselves with these phenomena with astonishment and admiration.

NOTES ON THE LARVÆ AND PUPÆ OF BIRCHIP HETEROCERA.

PART II.

By D. GOUDIE.

(Read before the Field Naturalists' Club of Victoria, 8th December, 1902.)

DESTOLMIA LINEATA, Walker.—The larvæ of this moth are to be taken in this district from the end of August to the beginning of October, feeding on the leaves of *Acacia stenophylla*. They belong to that class of caterpillars that are termed "loopers" by entomologists, on account of the way they arch their bodies when crawling. When not engaged in demolishing the leaves they generally rest on a twig, holding only by the claspers, after the fashion of the larva of *Gastrophora henricaria*, recently described and figured in the *Naturalist* by Mr. E. Anderson. They are very numerous at times, almost stripping the trees on which they feed; but so numerous and active are their parasitical enemies that the collector can consider himself lucky if he gets a single moth from twenty or thirty caterpillars. When full-grown they enter the hard earth, generally a foot or two from the butt of the tree, and there form a cell. The duration of the pupal stage under normal conditions is about six months, the moths emerging in March. I may also mention that these caterpillars are easily dislodged by shaking.

Larva.—Length, $1\frac{1}{4}$ to $1\frac{5}{8}$ inches. Head shining bluish green. Ground colour of body yellowish-green, slightly darker on lateral area. Dorsal line somewhat indistinct, dark green in colour. Below this there is a suffused crimson sub-dorsal line bordered with yellow below and pinkish white outlined narrowly with black above. A lateral row of plain black spots is also present, the first, close behind the head, being especially large and noticeable. Upper surface, with the exception of the first segment, covered with small white spots clearly outlined with black. A few short black hairs are also present. Ventral surface bluish-green, bordered with white. Hind claspers green, without markings. Legs green; feet dark red.

Pupa.—Length, from $\frac{1}{2}$ to $\frac{3}{4}$ of an inch. Moderately stout. Light green at first, changing to reddish-brown; anal segment terminating in a bifurcate spine. Dorsal half immediately above latter hollow.

NOTE.—In the first part of this paper, *Vict. Nat.*, xix., page 80, the words "not pronged like *X. cryptophaga*" should read "not pronged like *Cryptophaga leucadelpha*."

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 19th January, 1903. The president, Mr. T. S. Hall, M.A., occupied the chair, and about 65 members and visitors were present.

REPORTS.

Mr. O. A. Sayce reported on the Club's excursion to Beaumaris on Saturday, 13th December, at which about 13 members attended, and spent the afternoon searching the locality for specimens of interest. Unfortunately the tide was not favourable; still a number of interesting specimens were collected and preserved for further examination, though nothing new or very striking was noticed.

The excursion to Greensborough on 20th December was abandoned on account of rain, and that to Bulleen on 17th January on account of intense heat.

The hon. librarian reported the receipt of the following donations to the library:—"Memoirs of the Royal Society of South Australia," vol. ii., part 1, "The Cretaceous Mollusca of South Australia and Northern Territory," by R. Etheridge, jun., from the Society; *The Emu*, vol. ii., part 3, January, 1903, from the Australasian Ornithologists' Union; *Nature Notes*, December, 1902, from the Selborne Society, London; and *Knowledge*, December, 1902, from the proprietors; and that five volumes of the Cambridge Natural History—viz., Mammalia, Birds, Molluscs, Amphibia, and Insects, part 2—had been purchased.

The chairman announced that the Committee had ordered several other text-books.

ELECTION OF MEMBERS.

On a ballot being taken, Messrs. W. H. A. Rogers, National Bank, Collins-street, Melbourne, J. M. Spark, Isabella-street, Malvern, and J. F. d'Oliveyra, "Kooyong," Kooyong Koot-road, Hawthorn, were elected members of the Club.

PAPERS.

1. By Mr. D. Le Souëf, C.M.Z.S., entitled "Records of Snakes Casting Their Skins." This was a short paper, in which the author recorded the dates certain species of snakes cast their skins, while kept in confinement at the Melbourne Zoological

Gardens, together with some notes thereon. An interesting discussion ensued, chiefly relating to any effect the altered conditions of the snakes through being confined would have, in which Messrs. F. G. A. Barnard, G. A. Keartland, D. Best, O. A. Sayce, W. J. Morgan, and others took part.

2. By Mr. G. B. Pritchard, entitled "Geology of Flinders." The author described at some length the geological features of the district around Flinders, his remarks being illustrated by a large series of lantern views, showing the more interesting portions of the coast line from Shoreham to Cape Schanck.

Mr. Pritchard's remarks were discussed by Messrs. D. Le Souëf, F. Wisewould, and the President, the former stating that "Pulpit Rock" was so called from the fact that for many years there was on the rock a White-bellied Sea-Eagle's nest, which at a distance looked like a pulpit.

A vote of thanks was accorded Mr. J. Searle, on the motion of Messrs. G. Coghill and D. Le Souëf, for again placing his lantern at the disposal of the Club.

3. By Mr. J. G. O. Tepper, F.L.S., communicated by Mr. C. French, F.L.S., entitled "Notes and Remarks on the described Genera and Species of Australian and Polynesian Phasmidæ."

Owing to the lateness of the hour, this paper was taken as read and ordered to be printed.

A paper by Mr. J. F. Haase, entitled "Records of Victorian Entomostraca," was postponed until next ordinary meeting.

NATURAL HISTORY NOTES.

Mr. F. G. A. Barnard read the following paragraph from Bunce's "Travels with Leichardt":—"The River Yarra Yarra was then (October, 1839) densely covered on both banks with *Melaleuca* or Tea-tree and the *Monomeeth* Parbine. This latter was called 'the good mother' by the aborigines, from the seed-pod, or receptacle for the developing process of the seeds, being attached in whorls to the stems or branches on which they are produced years after the trees at those parts have shed their blossoms. The long, heavy branches of the *Monomeeth* Parbine hung in massive, graceful arches over the river's side;" and asked if any member could tell him what shrub was referred to as the "*Monomeeth* Parbine."

Mr. F. G. A. Barnard also read a paragraph from Mrs. Campbell Praed's recently published book, "My Australian Girlhood" (page 109), as follows:—"Bad times come, with the scab among the sheep, and the treading down of those green thick-leaved fat-hen plants (of which very good spinach could be made) in an access of activity round the disused boiling-down pots," and asked for information as to what plant was known as the "fat-hen plant."

Mr. J. A. Ross, Jumbunna, contributed a note on musical sand noticed by himself and others at Anderson's Inlet, in which he stated that while walking in their bare feet every step on the dry sand caused a "very distinct screech," which was not noticed on the wet sand.

In connection with this subject, Mr. J. A. Kershaw read an extract from the December number of the *Geological Magazine* (vol. ix., No. 12, p. 573, 1902), contributed by Mr. H. J. Lowe, F.G.S., entitled "Sonorous Sand," which he met with near Tenby, Skrinkle Haven Bay. He states that "the notes were clear and metallic, and were emitted only from the dry, loose sand above the range of the tide." He refers to explanations regarding these sounds. Dr. Julian and Professor Bolton attribute them to "a film of condensed air round each grain of sand, which acts as an elastic cushion, and enables the sand to vibrate when disturbed;" while Mr. C. Carus Wilson considers the sound to be caused by friction, "the cumulative effect of numerous vibrating particles that becomes audible."

Mr. F. Chapman, A.L.S., in remarking incidentally on the above note, said there was a probable explanation of the phenomenon in both the theories quoted, and that, whilst the primary cause of the sound was friction between the separate grains, this was perhaps assisted by a film of air acting as a cushion. This layer of air would, however, be better conceived as rarefied rather than condensed, for the occurrence of such sonorous sands seems generally to take place in warm climates, or under bright sunshine; but more direct evidence on this point is especially wanted.

Mr. D. Le Souëf, C.M.Z.S., mentioned that the Talegallas in the Zoological Gardens were breeding, and had hatched out several chicks during the last few days.

Mr. G. A. Keartland mentioned an instance in Queensland of the Talegalla interbreeding with the domestic fowl, and a hybrid fowl had laid 100 eggs this season.

EXHIBITS.

By Mr. F. Barnard.—Photographs by Mr. Mann of sections of Victorian woods from micro. slides prepared by the exhibitor; also, fasciated stem of Jessamine.

By Mr. F. G. A. Barnard.—Pot Fern, *Gleichenia circinata*, collected at Gembrook excursion in November, 1901.

By Mr. A. G. Campbell, on behalf of Mr. A. W. Milligan, W.A.—Skins of a pair of Western Brown-headed Honey-eaters, *Melithreptus leucogenys*, new species; Brown Shrike-Thrush, *Collyriocincla brunnea*; and Blue-headed Wren, *Malurus pulcherrimus*.

By Mr. Clifford Coles.—Life series of Pine-boring Beetle,

Promethis nigra, from the larva to the adult male and female, together with portion of tree from which they were all taken simultaneously at Ascot Vale; also, Little Penguin, *Eudyptula undina*, young in different stages, and egg, collected during the ornithologists' trip to the Nobbies, Phillip Island.

By Miss S. W. L. Cochrane.—Sponges and fossils from Warrnambool.

By Mr. G. Coghill.—Flowers of *Banksia serrata*, from Bairnsdale.

By C. French, jun.—Two varieties of White-lipped Snake, from Dandenong Ranges and Ringwood.

By Mr. J. F. Haase.—Specimens of Entomostraca, *Daphnia carinata* and *Simocephalus elizabethæ*.

By Messrs. G. A. Keartland and C. French, jun.—Clutch of four eggs of Princess of Wales Parrakeet, *Polytelis alexandree*, taken in December, 1902; also, eggs of Gilbert's Thickhead, Scrub Robin, Yellow-rumped Pardalote, and Graceful Honey-eater, from the Mallee District, collected in November and December, 1902.

By Mr. D. Le Souëf, C.M.Z.S.—An egg of the extinct Tasmanian Emu, collected about forty years ago in the St. Mary's district, on the east coast of Tasmania.

By Mr. D. M'Alpine.—The so-called petrified mushroom found by Mrs. Gray, of Hamilton, on the beach at Bridgewater, Victoria.

By Mr. F. Pitcher.—Flowers of the Scarlet-flowering Gum, *Eucalyptus ficifolia*, from Western Australia, showing floral development.

By Mr. G. B. Pritchard.—Eocene fossils from Flinders limestones, including *Plectroninia halli*, Hinde; *Bactronella australis*, Hinde; *Tretocalia pezica*, Hinde; and *Lepas pritchardi*, Hall.

By Mr. E. O. Thiele.—Some minerals, rocks, and fossils from the New South Wales coast, near Kiama.

By Mr. H. T. Tisdall.—A collection of marine shells from San Remo, Victoria.

By Mr. S. P. Townsend.—Specimens of rare Limicolæ, shot in Port Phillip Bay, around Mud Island: the Knot, *Tringa canutus*; the Turnstone, *Arenaria interpres*.

By Mr. H. B. Williamson.—The following plants from Victoria:—*Erophila vulgaris*, naturalized in Victoria; *Heliotropium europæum*, L., new for N.E. Victoria; *Xanthosia atkinsonia*, F. v. M., new for S.W. Victoria; *Gnaphalium purpureum*, L., new for Victoria; and *Haakea sericea*, new for S.W. Victoria.

After the usual conversazione, the meeting terminated.

RECORDS OF SNAKES CASTING THEIR SKINS.

BY D. LE SOUËF, C.M.Z.S.

(Read before the Field Naturalists' Club of Victoria, 19th January, 1903.)

It may be of interest to give some dates on which different snakes cast their skins, as it is a subject about which comparatively little is known. I therefore had records kept at the (Melbourne Zoological Gardens) for several months of some of those kept in captivity there, and from them one learns that the skins are cast far more frequently than is generally supposed to be the case.

Take, for instance, a Black-headed Snake, *Aspidiotes melanocephalus*, Northern Australia, which cast its skin on 20th April, 27th May, 30th July, and 18th September. Then, again, a Black Snake, *Pseudechis porphyriacus*, cast its skin on 15th April, 25th June, and 30th July; a Tiger Snake, *Hoplocephalus curtus*, on 22nd April, 21st July, and 31st December; an Olive-green Rock Snake, *Liasis olivacea*, from Northern Australia, on 12th April, 29th May, 18th September, and 24th January. A Carpet Snake, *Morelia variegata*, cast its skin on 19th April, 19th July, 20th September, 26th January, 18th May, and 1st September.

As can be seen from the dates, the skins are cast frequently, and irregularly as regards time; but it is possible that the snakes being kept in confinement, and possibly somewhat out of health, may have something to do with that, for when a snake has difficulty in shedding its skin except piecemeal it is generally a sign of ill health.

Just previous to the skin being shed it is usually lighter in colour, and opaque over the eyes, consequently the snakes are practically blind for the time being. They then rub their snout against some hard substance, such as a log or stone, and when they have succeeded in freeing the skin from the lips they gradually push it off. As a rule it is shed entire, including the skin over the eye. The larger non-venomous snakes are fond of lying in water for a few hours before changing, so as to soften the skin. The Indian Pythons nearly always do so, but their skin is generally shed piecemeal.)

These are only a few fragmentary notes, but later on I hope to be able to give them for a longer time. It is difficult to get the dates of changing without keeping these reptiles in confinement. They are not as a rule sought after as pets.

NOTES AND REMARKS ON THE DESCRIBED
GENERA AND SPECIES OF THE AUSTRALIAN
AND POLYNESIAN PHASMIDÆ OR "SPECTRE
INSECTS."

BY J. G. O. TEPPER, F.L.S., &c.

(Communicated by C. French, F.L.S.)

(Read before the Field Naturalists' Club of Victoria, 19th Jan., 1903.)

THE Phasmidæ form a well-defined family of the order Orthoptera, in the class Insecta, among the Articulata. They include the largest insects known, and are popularly called "Walking-stick Insects," or "Spectre Insects," on account of the excessive length of their bodies and limbs compared with their thickness and bulk. In this respect only one other family—that of the Mantidæ—approaches them in general size, form, and colouration. The latter, however, have very strong and stout raptorial forelegs, while the former have long, slender, and weak ones, not fitted for grasping, but for climbing, which indicates the respective habits. For, while the Mantids are exclusively predatory, the Phasmids are as exclusively herbivorous. I have observed one of the indigenous Mantids that had captured a Phasmid twice its size, and had, when seen, devoured about one-half of the larger insect. Another peculiarity is that the femora of the forelegs are bent or excised near their base in such a way that they can be extended forward parallel to each other, and then enclose the head between them. The middle and last pair of legs are usually stouter than the first, and in some cases furnished with strong ridges and more or less prominent spines and appendages.

The head is more or less flattened, elongated, and firmly fixed, so that it cannot be turned, as is the case with the Mantids. It is furnished with promiscuous palpi and antennæ of various length and number of joints, also sometimes with one to three ocelli.

The prothorax is very short comparatively; the mesothorax, however, exceeds the former several times in length, but bears the tegmina or wing-covers as well as the middle pair of legs at its posterior end. The metathorax, again, is short, but stout, bearing the hind legs, and the wings, if present. It is intimately conjoined to the first abdominal segment, the junction being indicated by a low transverse ridge above.

In many genera both sexes remain permanently wingless; in others the females alone remain so, while the males are provided with more or less ample wings; in the remainder, though both sexes possess wings as adults, the latter present a great variety in respect of their development, for, whereas those of the males are always permitting their use for flight, those of the females range down from most ample to most diminutive dimensions in different genera, so that the two sexes present a very different appearance,

rendering the correct mating very difficult for anyone not well acquainted with the living insects in their native habitat. Moreover, this difficulty is still more increased by not a single prominent character being quite permanent either in the sexes or the species.

Regarding the metamorphoses of our Phasmidæ, it may be remarked that the larvæ, when leaving the egg, have already the approximate form of the adults, except the wings and sexual appendages, but at this early stage the limbs of the young present a most disproportionate length compared with the insignificant size of their body, even in some of our largest species. This tiny body emerges first from the egg-shell, and is lifted perpendicularly above by the gradually extending limbs, their extremities being the last to get free, in this respect presenting an analogy to what takes place when a mosquito emerges from its pupa case on the water. The ova are more or less elongate, with the anterior end truncated, and closed by a lid, which is let in like a stopper, and pushed out by the infant larva when emerging. The above recorded observations specially refer to the hatching of some eggs of *Trophidoderus rhodomus*, M'Coy, deposited by a specimen sent to the S.A. Museum. Some of the larvæ died in the position mentioned, being unable to free their claws, owing to the air being too dry, which caused the fluids within the shell to dry too rapidly.

In connection with the succeeding metamorphoses, it may be mentioned that often, during the operation of withdrawing the limbs from the enveloping old skin, one or more of the legs become detached from the body, either wholly or in part. In such a case a young limb develops and grows from the wound. This is at first quite minute and extremely soft, but elongates and hardens in course of development, and is an analagous case to that of the limb-restoring capacity among some Crustaceans, and of the much higher Gecko Lizards respecting the tails. However, such restored limb or limbs remain frequently shorter and more slender than the others, although in other respects quite similar.

In their habits the Phasmidæ are chiefly nocturnal, remaining more or less quiescent during the daytime, and moving sluggishly when disturbed. They then sit quietly and almost immovably among the foliage, or are stretched out to their full extent along the twigs of trees and shrubs which they frequent. In these positions their colouration (green, grey, brown, or mottled), as well as their form, proves highly protective to them, being imitative of their surroundings. The bright red and other spots which adorn some species, on the contrary, serve as *warning* signals for birds and lacertilians, which are very fond of the plain-coloured kinds, but avoid the brightly decorated forms generally.

The Phasmidæ are distributed throughout the warmer regions of all continents, but in Europe only a few small wingless species occur, in the countries bordering the Mediterranean Sea. In Westward's "Catalogue of the Phasmidæ" 38 genera with 481 species, &c., are mentioned, including some 17 genera with 61 Australian and Polynesian species. But these have been since that time (1859) largely added to. In Rainbow's "Catalogue" of 1897 there are enumerated 17 genera with 61 species for Australia alone. In a list which appeared in the "Transactions of the Royal Society of South Australia," for 1902, 50 genera with about 122 species are recorded. Owing, however, to some uncertainty in correctly recognizing the sexual and larval states in some cases, on account of their great divergency in form, and (2) to the difficulty of correctly diagnosing allied species from dried or spirit specimens in others, the above numbers may admit of corrections and considerable fluctuations, according to the subjective views of observers and authors.

Economically only a few kinds have proved injurious to any considerable extent, and this no doubt owing to the blind destruction or diminution by man of their principal natural foes—viz., birds, smaller reptilians, and small mammals, especially lizards and bats, either through prejudice, savage love of destruction, or for sport. Of such economically injurious species the following may be mentioned:—*Graeffea* (*Lopaphus*) *cocophaga*, Gray, is known to have sometimes seriously injured young Cocoa Palm plantations at Fiji and elsewhere. *Hermardius* (*Phibalosoma*) *phytonius*, Westwood, is reported as occasionally greatly injuring the young shoots of sugar cane, which the insects resemble when at rest. *Podocanthus wilkinsoni*, Macleay, is stated to have defoliated considerable tracts of eucalyptus woods when present in inconceivably large numbers. Most other species (and perhaps the above too at ordinary times) are usually more or less rare and quite harmless.

The literature referring to the Phasmidæ is not very extensive, but scattered, costly, or otherwise not easily accessible. This paucity is largely due to considerable difficulties in collecting, preserving, and conserving specimens, as well as in accumulating extensive collections, owing to the large size, softness (when fresh), and fragility (when dry) of the specimens; nor are the insects, for the same reasons, in favour with collectors either. To this must be added the difficulty of correctly diagnosing from frequently mutilated or distorted specimens, and by descriptions in dead or foreign languages without illustrating figures.

The first to enter the list with an important classificatory work was G. R. Gray, in the early part of last century ("Synopsis of the Phasmidæ" and "Entomology of Australia"), followed by Latreille, Serville, and others. Next we have J. O. West-

wood's fine and illustrated but costly "Catalogue of Orthopterous Insects : Part I.—Phasmidæ" of 1859, supplemented by Henry de Saussure's voluminous "Melanges Orthopterologiques" (illustrated), 1869-71, with several minor works. In 1875 C. Stal published his still indispensable work (in Latin) "Recencio Orthopterorum," in the third part of which he furnished a systematic key for the classification of all the genera after the then known species of this family, and some time later some modifications in his "Observations" (1875) and "Orthoptera Nova ex Insula Philippinis Descripti."

The system elaborated in the first-mentioned work by Stal is that upon which the arrangement of the now forthcoming list has been based, and among which the genera and species described more recently have been intercalated, as well as I was able, but subject to correction probably.

The latest classificatory work known to me is Brunner von Wattenwyl's "Révision du Système des Orthopteres," 1893, in combination with descriptions of the Burma species. But as only a part of Stal's genera are therein mentioned it could not be availed of for the purposes of the list.

The following enumeration, however, shows the order in which Stal's genera are arranged, and will or may assist curators of larger collections of Australian Phasmids to arrange them accordingly, if so minded :—

Family—PHASMIDÆ, Brunner, Rev. Orth.

Tribe I.—LANCHODIDES (*op. cit.*, p. 81).

Myronides, Lanchodes, Dixippus, Hyrtacus, Promachus.

Tribe II.—BACUNCULIDES (*op. cit.*, p. 82).

No Australian, &c., species.

Tribe III.—BACTERIDES (*op. cit.*, p. 83).

Phibalosoma (to include Hermarchus, Stal), Bacteria, Bac-tridium, Asprenas (Neanthes = female of Asprenas), Orxines.

Tribe IV.—NECROSCIDES (*op. cit.*, p. 83).

Necrosia.

Tribe V.—CLITUMNIDES (*op. cit.*, p. 87).

Clitarchus, Pachymorpha, Karabidion, Eurycantha, Canachus.

Tribe VI.—ACROPHYLLIDES (*op. cit.*, p. 97).

Tropidoderus, Diura, Extatosoma, Podocanthus, Graeffea, Acrophylla, Ctenomorpha, Cyphocrania, Anchiale, Vetilia.

Tribe VII.—CLADOMORPHIDES (*op. cit.*, p. 98).

Heteropteryx, Pylæmenes.

Tribe VIII.—ANISOMORPHIDES (*op. cit.*, p. 98).

No Australian, &c., species.

Tribe IX.—PHASMIDES (*op. cit.*, p. 99).

Metriotes, Prisopus, Leosthenes.

Tribe X.—ASCHIPASMIDES (*op. cit.*, p. 100).

No Australian, &c., species.

Tribe XI.—BACILLIDES (*op. cit.*, p. 101).

Bacillus.

Tribe XII.—PHYLLIDES (*op. cit.*, p. 101).

Phyllium, Chitoniscus.

[The detailed list of species appears in the "Proceedings of the Royal Society of South Australia," vol. xxvi., part 2, pages 278-287.—ED. *Vict. Nat.*]

THE GEOLOGY OF FLINDERS.

BY G. B. PRITCHARD.

(*Read before the Field Naturalists' Club of Victoria, 19th January, 1901.*)

My intention in submitting a few geological notes on this district to members was not to write a detailed paper, but rather to explain some of the more interesting natural features along this part of our coastal line by means of lantern views, in this way reviving old memories of many present who have had the opportunity of enjoying the wondrous workings of nature in this neighbourhood, and to others, perhaps, a new interest in coast scenery for future enjoyment. This locality has been known geologically for a very considerable time, having been mapped and reported on in the first place by Mr. A. R. C. Selwyn as early as 1854; but, strange to say, though so interesting, very little work has been done since. One of the points of attraction has been a small outcrop of Older Tertiary limestone and sand on the shore-line just below the racecourse, and about a mile west of West Head. This spot has been honoured by a very large number of visits from geologists, but still it appears as rich as ever in organic remains. At first sight there does not appear to be much variety, but one is struck by the abundance of Foraminifera, Calcisponges, and Polyzoa, but on closer investigation the fauna shows very interesting variety, for, in addition to the groups already mentioned, representatives of Echinoderma, Palliobranchiata, Crustacea, Cirripedia, Lamellibranchiata, and Gastropoda also occur. Some of these remains are in a good state of preservation, being of a type capable of retaining their form, even in such an extremely porous stratum; but others, notably the Gastropoda, are usually only preserved as internal casts. The character of the enclosing rock being against the retention of the external features, it is seldom that trustworthy identifications can be made. One group of fossils to which considerable interest attaches is that which has been so ably worked at by Dr. G. J. Hinde—namely, the calcareous sponges—which proved of considerable value from a biological as well as from a palæontological point of view.

Another attraction has been the beautiful zeolites and other

minerals to be obtained from certain layers of the old lava flows. Beyond general collecting of the above character, little or nothing appears to have been done.

Regarding the old volcanic rocks of the district, usually referred to as "Older Basalt," Mr. Selwyn's original description on his map gives a good idea of their character:—"Cliffs of hard, dark basalt, with bands of soft red earthy porphyritic rock, probably beds of volcanic mud. . . ." In his report * he gives a much fuller and more accurate description of these rocks, mentioning that—"The principal area occupied by them extends eastward from Arthur's Seat to Cape Schanck, embracing nearly the whole of the islands and southern shores of Western Port Bay." Regarding the mapping of this area, exception has been taken to its delineation in the neighbourhood of Sandy Point by Mr. T. S. Hall, M.A., in his report on the geology of the Shoreham camp-out † for he remarks:—"At Sandy Point, Mr. Grant tells me, Silurian crops out on the beach pretty extensively. Selwyn maps the country there as volcanic." On the 1854 map this area is undoubtedly coloured wrongly, but who was responsible for this error it is difficult to say. Apparently it should have been coloured as Palæozoic, for the boundary, though perhaps a tentative one, is clearly defined. The part towards Sandy Point is indicated with a Tertiary capping. However, on the part apparently erroneously coloured there is clearly printed a remark which also extends well into the area coloured as Palæozoic:—"Very little rock to be seen in place from which the geological formation can be ascertained. Probably Palæozoic sandstone and slate." This would mean an extension of the Palæozoic over towards and under Sandy Point, as the Tertiary is mapped as yellow dots, which is usually taken to indicate a thin capping. Then on the 1856 map, for some reason or other, the boundary line running from Hann's station north-westerly is omitted, and the Palæozoic remark is contracted into the more northern areas. Thus, though the later map has more detail, and covers a larger area, the earlier one would have been better but for the slip in colouring, so far, at any rate, as the Sandy Point area is concerned. The 1856 map, however, shows the Tertiary outcrop on West Head and its westerly extension, whereas this feature is absent on the earlier one. This region, during the reign of volcanic activity, must have been a particularly warm quarter, and it appears to me that the whole series of volcanic rocks of this end of the peninsula is but the remnant of a nest of volcanic cones.

* "On the Geology, Palæontology, and Mineralogy of the Country situated between Melbourne, Western Port Bay, Cape Schanck, and Point Nepean, accompanied by a Geological Map and Sections," by A. R. C. Selwyn. November, 1854.

† *Vic. Nat.*, vol. xix., No. 1, May, 1902, p. 17.

Judging by the decomposed breccia beds, ash beds, lava streaks, and occasional dykes, by the changing dip of the ash, and other layers at different spots, there were several points of eruption in the neighbourhood. One of these I would locate near Shoreham, and inland from the present coast; another about a mile and a half west from West Head and close to the present coast line; and a third a short distance seawards from Elephant Rock and the Blowhole, a locality about three miles east from Cape Schanck. The Cape Schanck material may have come from the same point of eruption as the last, or perhaps from a closely adjoining vent.

Selwyn remarks on the hardness of the olivine basalt and on the absence of scoriaceous trap. Certainly some of the rock is very dense, especially some of the shingle pebbles, but a great deal of it is vesicular to a considerable extent, apart from some of the zeolite layers, which are particularly cavernous. The materials appear to me to clearly indicate the eruption of alternations of ash and lava, some of the ash being fairly coarse, angular fragments, apparently of decomposed scoria, of considerable dimensions being frequently met with at each of the above-mentioned localities. In some of the coast sections as many as eight and nine lava flows with intercalated layers of ash and breccia can be distinctly made out, especially at the Elephant Rock section.

The basalt layers are well and closely jointed, and as a consequence the weathering has made marked inroads, and much of the rock is badly decomposed. Very good examples of columnar and tabular jointing may be examined at various spots, the latter structure being on the fine as well as on the coarse scale. On the other hand, the ash layers, owing to their present clayey consistency, are tough and tenacious when wet, and resist removal to a marked extent, but when dry shrinkage cracks break the mass up in a more or less rubbly manner, and the material falls away rapidly. Thus, in the cliff sections above high water mark the ash layers are frequently somewhat excavated, whilst the harder basalt layers, though much battered-looking and rounded off, form fantastic projections which lend to the cliffs along this coast much of their natural beauty.

Then, again, the marine denudation lends another and perhaps the strongest charm. The ceaseless battering to which the base of the cliffs is subjected appeals to one so strongly that more result is almost expected, for when one visits the same spot year after year, and can notice no appreciable difference, the enormity of time required by Nature for most of her carvings appears quite incomprehensible. Yet there is the result. We gaze! and admire! and try to comprehend as much as possible.

[An excellent series of lantern views was shown in illustration of the author's remarks.—Ed. *Vict. Nat.*]

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 9th February, 1903. Mr. O. A. Sayce (one of the vice-presidents) occupied the chair, and about 45 members and visitors were present.

REPORTS.

A report of the Club's excursion to Launching Place from Saturday to Monday, 24th–26th January, was read by the leader, Mr. F. G. A. Barnard, who said that a most enjoyable outing had been spent, and some profitable work done, more especially in botany. The locality proved to be a good one for field work in most branches of natural history.

The hon. librarian reported the receipt of the following donations to the library:—"The Queensland Flora," part vi., by F. M. Bailey, F.L.S., Government Botanist, from the Department of Agriculture, Queensland; and *Knowledge*, January, 1903, from the proprietors. Also that the following works had been purchased:—"Natural History of Plants," by Kerner and Oliver (2 vols.); "Geology of Sydney and Blue Mountains," by J. M. Curran; and "The Foraminifera," by F. Chapman, A.L.S.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. A. J. Day, Lands Department, Melbourne, and Mr. Gordon Woods, Marshall-street, Moonee Ponds, were elected members of the Club.

PAPERS.

1. By Mr. J. F. Haase, entitled "Records of Victorian Entomostraca."

The author gave a brief outline of the group, and recorded five species of the sub-order Cladocera, pointing out their characteristics.

The chairman (Mr. O. A. Sayce) and Mr. J. Shephard made some remarks on the paper.

2. By Mr. G. A. Kearland, entitled "Notes on the Genera *Polytelis* and *Spathopterus*."

The author dealt more particularly with the habits of the parrots belonging to these genera, both in confinement and in their natural state, and drew attention to some of the variations in plumage in the young forms.

Messrs. C. Coles, G. Coghill, and J. A. Kershaw discussed the paper, the latter expressing a hope that Mr. Kearland would

continue the work, especially the description of the intermediate stages, the accomplishment of which would be much appreciated by all workers in this branch.

3. By Mr. A. G. Campbell, entitled "Notes on the Geology of King Island."

The author gave the results of some geological observations made on a recent trip to King Island, and pointed out the relations between the geology and the pastoral products of the island.

Mr. F. Chapman made a few remarks on the paper.

4. By Mr. D. M'Alpine, entitled "The Micro-Fungi of Australian Lobelias."

The author recorded the finding of nine different kinds of fungi on a single species of Lobelia, and stated that eleven different species of fungi are to be recorded as occurring on Lobelias for Australia alone, each species of which belongs to a different genus.

Messrs. F. G. A. Barnard and the chairman made some remarks on the paper.

NATURAL HISTORY NOTES.

Mr. Fred. S. Bryant contributed a note on "Minahs as Vermin Destroyers," in which he stated that he had seen a pair of Minahs (no doubt the introduced Indian Black-headed Minah *Temenuchus pagodorum*) destroy two mice, and afterwards found a third mouse apparently killed in the same manner.

Mr. F. Chapman, A.L.S., read an extract from a recent paper on some Foraminifera collected on the South Australian coast, and asked collectors to be on the watch for the species here.

Mr. A. D. Hardy made some remarks on his exhibit of the skins of the Rattlesnake, *Crotalus confluentus*.

EXHIBITS.

By Mr. F. G. A. Barnard.—Coleoptera, including *Schizorhina besti*, collected during Launching Place excursion.

By Mr. C. French, jun.—Two rare Victorian beetles—viz., *Tragocerus spencei*, from Mordialloc, and *Chalcophora albivittis*, from South Gippsland; also a beetle, *Cnemoplites (Malladon) edulis*, very destructive to the Banksias on the coast near Cheltenham, Mordialloc, &c.

By Mr. A. D. Hardy.—Skins of Rattlesnake, *Crotalus confluentus*, Mexico.

By Mr. G. A. Keartland.—Skins of *Polytelis barrabandi*, *P. melanura*, and *Spathopterus alexandree*, in illustration of his paper.

After the usual conversazione, the meeting terminated.

EXCURSION TO LAUNCHING PLACE.

THIS excursion was arranged so as to allow of three days' collecting - viz., 24th, 25th, and 26th January. Launching Place is picturesquely situated on the Yarra, forty-one miles from town by the new Warburton railway. The party consisted of Messrs. R. Felstead, A. D. Hardy, C. S. Sutton, G. Weindorfer, and F. G. A. Barnard (leader). The first day (Saturday) was spent in visiting Warburton, seven miles further up the Yarra. Here a brief visit was made to the Yithan Creek, about two miles from the township, where a good variety of ferns was obtained. *Asplenium umbrosum*, *Polypodium grammitidis*, and *Pteris incisa* were particularly fine, and good specimens of *Asplenium bulbiferum* bearing numbers of young plants on the fronds were also secured. Altogether some sixteen species of ferns were noted. Among shrubs the most noticeable were *Correa lawrenciana* (in bloom); the Native Currant, *Coprosma billardieri*, laden with fruit; and the Native Elder, *Sambucus gaudichaudiana*, also in fruit. Some specimens of the terrestrial amphipod, *Talitrus sylvaticus*, were collected for anatomical observations. On returning to Launching Place an hour or two was spent among the shrubs along the Yarra, when some bushes of the Prickly Box, *Bursaria spinosa*, were found to be fairly alive with beetles. Among the specimens secured may be mentioned *Eupacila* (*Schizorhina*) *australasiae*, Don; *Polystigma* (*Schizorhina*) *punctata*, Don; *Curis auro-vittata*, Boh.; *Stigmodera burchelli*, Gory; *S. bicincta*, Bdv.; *Lamprima splendens*, Erich.; *Hesthesis cingulatus*, Kirby; *Omotes erosicollis*, Pasc.; *Obrida fascialis*, White; and *Mordella dumbrella*, Lea. Later on in the evening *Schizorhina christyi* was taken on the wing. Some fine specimens of the Bullrush, *Typha angustifolia*, were collected; also some mud from the bed of a dried-up lagoon for the purpose of cultivating Entomostraca, &c., at home.

Next day (Sunday) Malleson's Glen, on the Don River, about five miles from Launching Place, was visited. Here the ferns *Lomaria lanceolata* and *L. fluviatilis* were particularly fine; *Aspidium capense*, and several other species, were added to the list. Fine specimens of the Sassafras, *Atherosperma moschata*, and the Beech, *Fagus cunninghami*, exist in this gully. A single specimen of the Black Land-snail, *Helix atramentaria*, was taken, and further examples of the amphipod, *Talitrus sylvaticus*. *Correa lawrenciana*, *Lomatia longifolia*, and the orchid *Microtis porrifolia* were noted in bloom. A couple of specimens of the beetle *Schizorhina besti* were taken on the *Bursaria*.

The last day (Monday) was devoted to a visit to the Britannia Creek valley, situated in the ranges midway between the Yarra and the Little Yarra, about five and a half miles from Launching Place. The most noticeable flowers collected were *Mazus*

pumilio, *Helichrysum leucopsidium*, and *H. ferrugineum*. *Come-sperma ericinum*, *Tetratheca ciliata*, *Dianella longifolia*, and *Lobelia simplicicaulis* were also noted in bloom. A couple more species of ferns were added to the list, and regret was expressed that time did not allow of further exploration in such an interesting district.—F. G. A. BARNARD.

RECORDS OF SOME VICTORIAN ENTOMOSTRACA.

BY J. F. HAASE.

(WITH PLATE.)

(Read before the Field Naturalists' Club of Victoria, 9th Feb., 1903.)

THE object of writing this paper is to bring before the members this very interesting group, the study of which has been so peculiarly neglected in our State. The species here mentioned are the most likely forms to be met with in the neighbourhood of Melbourne.

This paper will only deal with the Cladocera, one of the three groups of the Entomostraca, the other two being Ostracoda and Copepoda.

A few brief remarks dealing with their habits and mode of reproduction may be of interest, particularly to those members who may not have the opportunity to avail themselves of the literature on the subject. As far as I am aware there are no figures obtainable of the below species in our public libraries, and I have thought it not out of place to illustrate the specimens recorded.

The body, with the exception of the two pairs of antennæ, is enclosed in a shell or carapace, joined at the dorsal surface. The ventral edges are open and movable.

Throughout life the animal undergoes a series of moults, more noticeable in the young. Being much afflicted with growths of Vorticella on the edges of the shell and appendages, rapid moulting is a great advantage.

Respiration is carried on by means of branchiæ attached to the feet. The feet, 5-6 pairs, vary in number in different genera. They are not adapted for locomotion.

The head is furnished with two pairs of antennæ, the superior being one or two jointed, and having at the apex a number of fine setæ. These setæ are considered to be the olfactory organs. The inferior or swimming antennæ are very large, two-branched, many-jointed, and often densely plumose.

The eye is single and very distinct. An ocellus is often present, sometimes small, but in the Chydoridæ attains a large size.

The alimentary canal, which is generally very conspicuous, is

nearly straight, but in some families becomes looped. Connecting the mouth with the stomach is a short cesophagus.

There are two kinds of females—parthenogenetic, and the ephippial, or sexually matured form.

The ordinary or parthenogenetic female deposits a number of ova in the brood-cavity on the dorsal surface, being held in position by the large curved lappet on the dorsal surface of the tail.

When fully formed the young are thrown out at the posterior edges of the valves. There is a close resemblance to the parent.

Towards the summer males begin to appear, and now are developed by the females what are known as the resting eggs. These eggs require fertilization in order to develop. After fertilization, the ephippium, with the enclosed eggs, is thrown off, and, as the pond dries up, becomes embedded in the mud. There the eggs will remain until the autumn rains fill the pond, when the young will again appear, and so start another cycle of generations. A few words about the male may be of interest. In size they are inferior to the female. The shell is more angular and much narrower. The superior antennæ are larger, and often attain a considerable length. The first pair of feet are generally provided with a strong curved hook. Time of appearance coincides with that of the ephippial female.

SUB-ORDER—CLADOCERA.

FAMILY—DAPHNIDÆ.

Genus—Daphnia, Muller.

Daphnia carinata, King, Proc. Roy. Soc. Van Diemen's Land, vol. ii., part 2, p. 246, plate i., p. 253, plate vi.A; G. O. Sars, Arch. Natur, Christiania, xviii., No. 2, pp. 2-11 (including typical form and varieties *intermedia* and *magniceps*).

This fine species is very abundant in the vicinity of Melbourne, occurring in almost every small pond, attaining a very large size in pools of a clayey nature. In common with others of the genus, variation occurs to a considerable degree, both in the shape of the crest and length of spine. Fig. 1 closely resembles typical form figured by Prof. G. O. Sars. Fig. 2 shows a very distinct variety from a pond in the Albert Park, the spine being extremely short. This is very noticeable even in the very young.

Distribution.—Near Sydney (King); near Hay; near Sydney (Sars); neighbourhood of Melbourne, Werribee.

Genus—Simocephalus, Schœdeler.

Daphnia elizabethæ, King.

Simocephalus elizabethæ, King, G. O. Sars, Vid. Selsk, Christiania, 1888, No. 7, pp. 22-25, plate ii., figs. 6 and 7.

S. elizabethæ, King, Sars, Arch. Natur, Christiania, xviii., No. 3, pp. 11 and 12.

I have found this handsome species abundantly at Heidelberg. Up to the present no ehippial females or males have come under my notice. This form has kept very well in a small aquarium, increasing moderately during the last eight months.

Distribution.—Near Rockhampton; near Sydney (Sars); neighbourhood of Melbourne.

S. acutirostratus, King (syn. *S. paradoxus*, Schœdeler; *Daphnia elizabethæ*, var. *acutirostratus*, King).

S. acutirostratus, King, G. O. Sars, Arch. Natur, xviii., No. 4, p. 12, plate ii, fig. 1-3.

A few fine specimens were taken at Mordialloc during September. It can be easily distinguished from the preceding species by the acute rostrum, also in being much larger and of a deep green colour.

Distribution.—Near Sydney (G. O. Sars); Mordialloc.

Genus—*Moina*, Baird.

Moina tenuicornis, G. O. Sars, Arch. Natur, Christiania, xviii., No. 3, pp. 24-27, plate iv.

This is a very abundant species, increasing at an astonishing rate. The body of the female has an orange tinge. The males are highly pellucid.

Distribution.—Near Sydney (G. O. Sars); neighbourhood of Melbourne.

. FAMILY—CHYDORIDÆ.

Genus—*Pleuroxus*, Baird.

Pleuroxus inermis, G. O. Sars, Arch. Natur, Christiania, pp. 31-35, plate v., figs. 8 and 9.

This very small species was reared by me from some mud taken at Heidelberg. It generally keeps close to the bottom, swimming about at a very rapid rate.

Distribution.—Near Sydney (G. O. Sars); neighbourhood of Melbourne.

EXPLANATION OF PLATE.

Fig. 1.—*D. carinata*, typical form; *s*, spine.

Fig. 2.—*D. carinata*, variety; *e*, ehippium.

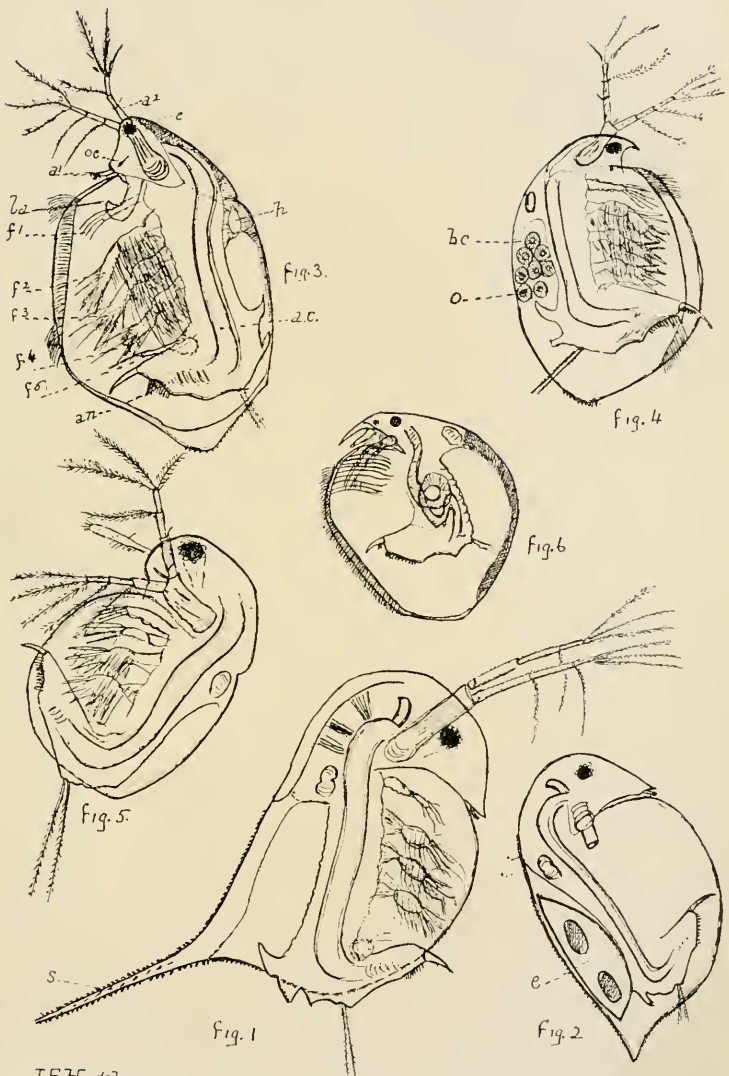
Fig. 3.—*S. elizabethæ*; *f*¹-*f*⁵, feet (five pairs); *e*, eye; *oc.*, ocellus; *a*¹, first antennæ; *a*², second antennæ; *la.*, labrum; *h*, heart; *a.c.*, alimentary canal; *an.*, anus.

Fig. 4.—*S. acutirostratus*; *b.c.*, brood cavity, containing ova, *o*.

Fig. 5.—*M. tenuicornis*.

Fig. 6.—*P. inermis*.

(All figures highly magnified.)



VICTORIAN ENTOMOSTRACA.

NOTES ON THE GENERA POLYTELIS AND
SPATHOPTERUS.

BY G. A. KEARTLAND.

(Read before the Field Naturalists' Club of Victoria, 9th Feb., 1903.)

THE genera under notice are probably the most interesting of our Australian parrots. In some respects they occupy a mid-position between Psephotus and Trichoglossus, but are quite distinct from either. Whilst their flight is as rapid as that of the latter, the extreme length of the wings and tail form a distinguishing feature. Although their bills are not so broad as that of Psephotus, they are able to crack and shell grain and seed rapidly. At the same time the upper mandible is not so pointed as that of the Trichoglossi, but they extract honey from blossoms with equal facility. In fact, one of the prettiest sights I saw during a trip to Riverina was a flock of male *Polytelis barrabandi* devouring the honey in the blossom of the yellow box. They suspended themselves in all manner of attitudes, and worked away regardless of whether head, tail, back, or breast was uppermost. Owing to the length of their wings these birds are able to travel a great distance in a short time, and they always seem to be in a hurry. Still their geographical range is somewhat restricted. In captivity the *Polytelis* become most interesting pets on account of their activity and gentle disposition. Whilst the *Platycerci* almost invariably become spiteful after a year's confinement, the *Polytelis* seem to increase in confidence and affection for their keeper. A brief note on the different species will perhaps prove interesting to some of our ornithologists, commencing with

POLYTELIS BARRABANDI, Green-Leek Parrakeet.

Although this bird has its headquarters in southern New South Wales and northern Victoria, in the early days of the colony flocks of them were found as far south as the Yarra River at Heidelberg, and along the creeks at Keilor. My late father shot them at both places. They are also occasionally seen along the Warrego and Condamine Rivers in Southern Queensland. These beautiful parrakeets are now found in greatest numbers along the courses of the Murrumbidgee and Murray Rivers, where they breed in the hollow spouts of the giant trees on the river flats, usually selecting the highest branches. During the breeding season the males congregate in flocks, whilst their partners are engaged in the work of incubation. As illustrating their sociable disposition, I may mention that as many as four nests containing young ones were found in one tree. The Green-Leek feeds on grass seed and thistles during part of the year, but as soon as the eucalypts blossom honey becomes its staple food. During the first year there is difficulty in distinguishing the sexes.

The plumage is almost uniformly dull green, with a slight roseate tinge on the throat, pink on the inner webs of the tail feathers, and scarlet on the thighs. At the age of six months the first moult takes place, but beyond a slight brightening of the colours no perceptible change is noted. At twelve months the male changes to a beautiful bright green and acquires the gamboge-yellow forehead, face, and throat, with a bright scarlet crescent dividing the lower margin of the yellow from the green. At the third moult the scarlet on the thighs disappears, and the inner webs of the tail feathers become black. The female undergoes very slight change in plumage beyond losing the scarlet on the thighs.

POLYTELIS MELANURA, Black-tailed Parrakeet.

This is decidedly the largest species of the genus, and is also known as the "Smoker" and "Rock Pebbler." It is confined to a comparatively narrow strip of country, embracing Southern New South Wales, Northern Victoria, across South Australia to near King George's Sound in the west; but the greatest numbers are seen in the St. Arnaud and Wimmera districts. They are partial to Mallee country, where they find sufficient grass seeds to supply their wants during the greater portion of the year, but when the Mallee is in blossom, which usually happens about September or October, they abandon the seed in favour of honey. During these months the young broods are reared. The eggs, five or six in number, are deposited in the hollow spout of any convenient tree, generally in the vicinity of fresh water. In favourable seasons as many as five or six young ones may be taken from a nest, but when, as often happens in the Mallee, the season is dry and blossom scarce, only one or two eggs are hatched. At the age of about three weeks the young leave the nest. The birds then congregate in flocks, and remain so for about three months, when they separate into pairs or small groups. During the breeding season the males may be seen in flocks whilst their mates are sitting, but as soon as the young are hatched both parents assist in supplying their wants. Like *P. barrabandi*, the young of both sexes resemble the female. The adult male has head, neck, and under parts all bright jonquil-yellow, olive saddle, with scarlet patches on the wing coverts. The under side of the tail is black. The female is dull olive-green where her mate is yellow. The inner webs of the tail feathers are rosy pink. The remaining marks are similar, but not so bright as those of the male.

SPATHOPTERUS ALEXANDRÆ, Princess Alexandra Parrakeet.

This bird was placed in the genus *Polytelis* by Gould, but when a series of carefully sexed birds, collected by myself on the Horn Scientific Expedition, was submitted to Mr. A. J. North,

that gentleman noticed a peculiar spatula formation at the end of the second primary feather, and at once placed it in a separate genus under the name of *Spathopterus*. Mr. North's action has been challenged by some local critics, but the fact that the British Museum authorities have endorsed the alteration should satisfy our members that the change was warranted. As Gould has omitted any mention of the sexes of the specimens he examined, it is only just to assume that the required information was not at hand. However, as the birds exhibit many of the characteristics of the *Polytelis*, I have embraced them in this paper. The range of this species has been traced from about 100 miles east of Alice Springs in Northern Territory to near Mount Bates in Western Australia, and from Joanna Springs in the North-West to the Finke River, at Crown Point, in the southern part of the Northern Territory. During the greater part of the year they are in flocks scattered over the most desert-like portions of the interior, where they subsist on the small seeds of the *Spinifex* (*Triodia*), and seek shelter in the desert oaks (*Casuarina*). But whenever their breeding places have been discovered they were near water. During September or October, 1895, Mr. Chas. Pritchard found them breeding on the Todd, Hugh, and Palmer Rivers. Although they had not been known to visit those localities during the previous thirty years, strange to relate, they bred there again in 1901. With the exception of the spatulate wing feathers, previously alluded to, the sexes are alike in plumage, and the young differ very slightly from their parents. Mr. A. Zeitz, of Adelaide Museum, who has bred several young ones in his aviary, informed me that the spatule does not appear until the third moult. Gould was slightly in error in stating that this bird is of the same size as *P. barrabandi*. It is much smaller, but has a longer and narrower tail.

NOTE ON AN INTERESTING OCCURRENCE OF THE
PELAGIC FORAMINIFER, *CYMBALOPORA* (*TRETOMPHALUS*) *BULLOIDES*, ON THE COAST OF
SOUTH AUSTRALIA.

IN the "Journal of the Quekett Microscopical Club," November, 1902, pp. 309-322, Mr. A. Earland has given an account of some pure foraminiferal material, formed of the above species, which was gathered by Mr. E. H. Matthews, of Yorke Town, South Australia. The latter recounts finding the material stranded on the shore at Corney Point, Hardwicke Bay, west of Yorke Peninsula. Mr. Matthews says:—"The tide was beginning to ebb, and I found along the ripple edge what I took at first to be seaweed spore, got my glass out and found it to be this foram. . . . I gathered about a teaspoonful, and could have got

pints. In places it was four or five inches wide, and extended for quite a quarter of a mile. . . . The bay extends for about eighty miles, and is more or less sandy along the whole length, and shallow, the five-fathom line ranging about one and a half miles from the beach—in fact, I do not think any part of the bay exceeds seven fathoms. The bottom in patches is densely covered with a growth of sponges and seaweed, with muddy ooze containing Lima and other mollusca.”

Mr. Earland discusses in detail the relationship of the “balloon” chamber and the inner float chamber, and the latter, he suggests, may possibly be used to modify the specific gravity of the shell, as a means of travelling upwards from the sea bottom or *vice versa*.

In view of clearing up many points of great interest and importance regarding the function of the “balloon” chamber and its reproductive contents, it is hoped that local naturalists here and elsewhere, who are favourably situated, will look out for such occurrences, and endeavour to preserve the fresh material either in spirit or formalin for future observation. Hitherto this particular form has been usually found in the neighbourhood of coral reefs and in lower latitudes.

As Mr. Earland observes, these shoals of organisms must have been driven ashore by steady currents caused by the north wind, which had been blowing in the same direction for some days.—
F. CHAPMAN, A.L.S.

BOOK NOTICES.

NATURE IN NEW ZEALAND. Compiled by Jas. Drummond and edited by Capt. F. W. Hutton, F.R.S., Director Christchurch Museum. Christchurch: Whitcombe and Tombs Ltd. 1902. Price 2s. 6d.

“NATURE in New Zealand,” the editor tells us, originated in a series of conversations between Mr. Drummond and himself, which formed the foundations for several newspaper articles, entitled “Rambles in a Museum.” These, it was afterwards thought, with a little modification would form a suitable Natural History reading book for schools, hence the book under notice. Though designed for a school book, it is written in such a form that many an older student will be glad to avail himself of its pages, and to Australian students it is especially valuable. It is charmingly written, well illustrated, and beautifully printed. New Zealand being naturally so deficient in mammals, reptiles, and insects, the authors have been compelled to make considerable use of birds, but geology and plants have not been forgotten, while some seventy pages are devoted to the origin and history of that extremely interesting race, the Maoris. An appendix giving the principal authorities on New Zealand natural history and on

the Maoris, hints on the pronunciation of Maori names, summaries of the chapters, and a good index, help to complete the volume, and make up a book which should be on every nature student's bookshelf.

NATURE STUDIES IN AUSTRALIA. By Wm. Gillies, M.A., and Robert Hall, C.M.Z.S., F.L.S. Melbourne : Whitcombe and Tombs Ltd. 1903. Price 2s.

This little volume of rather more than 300 pages, to which Mr. Frank Tate, M.A., Director of Education, contributes an excellent introduction, has been published "as a reader designed to interest the senior boys and girls of elementary schools." Seeing that so little has been written in the way of popular books on Australian Natural History, we feel sure that older folks cannot fail to be interested and instructed by perusing its brightly written and illustrated pages, learning thereby something of the why and wherefore of the life around them. As may be expected from the sympathies of one of the authors, the book deals largely with bird-life in its different aspects, but the lower forms of life, such as reptiles, marine creatures, and insects, have not been overlooked. The chapters are written in the conversational style, by which the authors have been enabled to lay greater stress on certain points. The illustrations, which number about eighty-five, include a coloured frontispiece of the heads of robins, showing the "recognition marks." The final chapter, headed "Method in Nature Study," shows how to apply the lessons to everyday observations. Fifteen pages of notes, really an extended glossary, should prove useful to the young student. The most novel feature in the volume is a "Nature Study Calendar for Victoria," in which has been attempted for the first time a monthly record of the first appearance, &c., of birds, insects, other animals, and flowers. As Victoria presents several marked differences of climate, the records are arranged according to the divisions adopted by the late Baron von Mueller in part ii. of his "Key to the System of Victorian Plants," and the authors are to be congratulated on the clearness of the scheme, which cannot fail to arouse a greater interest in the study of nature, and in future editions of the work can be improved and extended. A list of the common names of Victorian birds and a copious index complete the work, which we trust will be adopted for the senior classes of public and private schools throughout Victoria.

HONOURS.—At the twentieth congress of the American Ornithologists' Union held in Washington, D.C., in November, 1902, Mr. A. J. North, C.M.Z.S., Ornithologist of the Australian Museum, Sydney, was elected a Corresponding Fellow of the Union.

MR. Robert Hall, the well-known bird-lover, and member of the Field Naturalists' Club of Victoria, left Melbourne early last month on an extended collecting trip through Ceylon, Singapore, and Japan to Siberia, and thence to Europe. He is accompanied by Mr. R. E. Trebilcock, of Geelong, also an enthusiastic naturalist, and we wish them every success in their investigations.

PULPIT ROCK, CAPE SCHANCK.—The Pulpit Rock, off Cape Schanck, was named over sixty years ago on account of its bearing on its summit an excrescence about 6 feet high that suggested to seafaring men passing by in their vessels the appearance of a pulpit; but few, if any, knew what the so-called pulpit was composed of. In reality it was the nest of a pair of White-bellied Sea-Eagles, *Haliaeetus leucogaster*, which had probably been used for many years, and so had reached a very large size. It was composed mostly of sticks, many being fairly large, as well as some seaweed, bones, &c.; but unfortunately for the birds they were both shot by visitors from Flinders many years ago, and the nest, strong as it was, has gradually been blown away bit by bit, until nothing remains of it. The rock on which it was placed, and which is named "Pulpit Rock" on the chart, is now often wrongly called by visitors "Pyramid Rock," as they see nothing on it that gives the appearance of a pulpit. Pyramid Point is on Phillip Island. Although this rock is close to the mainland, it has surf breaking all round it, and in consequence is exceedingly difficult to land on, and one life was lost some years ago in an attempt to do so, the venturer being drawn out to sea and drowned.—D. LE SOUEF.

[An illustration of Pulpit Rock will be found as a frontispiece to vol. ii. of "The Aborigines of Victoria," R. Brough Smyth, F.L.S., Melbourne, 1878.—ED. *Vict. Nat.*]

PROSTANTHERA WALTERI, F. v. M.—This shrub, originally found by Mr. C. Walter on Mount Ellery, Croajingolong, East Gippsland, in December, 1869, and named after him by Baron von Mueller ("Fragmenta," vol. vii., p. 108), and subsequently found by a New South Wales collector on Mount Hay in that State, has recently been added to the flora of N.E. Victoria, having been found by Dr. Sutton and Messrs. Barnard and Weindorfer during a collecting trip in the Buffalo Mountains, December, 1902.

NEW AUSTRALIAN BIRDS.—*The Ibis* for October, 1902, contains coloured plates of the two new Australian birds, *Eremiornis carteri* and *Platycercus macgillivrayi*, named and described by Mr. A. J. North, C.M.Z.S., Australian Museum, Sydney, in the *Victorian Naturalist*, vol. xvii. (1900). The birds were exhibited at a recent meeting of the British Ornithologists' Club, and the illustrations are accompanied by some remarks by Dr. Sclater, F.Z.S.

The Victorian Naturalist.

VOL. XIX.—No. 12. APRIL 9, 1903.

No. 232.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 9th March, 1903. The president, Mr. T. S. Hall, M.A., occupied the chair, and about forty-five members and visitors were present.

REPORTS.

Mr. J. Shephard reported that, owing to bad weather, the excursionists to Black Rock on Saturday, 14th February, were disappointed with the results of their outing. The intention was to have used the tow-net for surface forms, but, owing to the water being too rough, the attempt made was unsuccessful.

The hon. librarian reported the receipt of the following donations to the library :—"Proceedings of the Royal Society of Victoria," new series, vol. xv., part 2 (1903), from the society ; *Wombat*, vol. v., part 4 (December, 1902), from the Geelong Field Naturalists' Club ; *The Agricultural Gazette of New South Wales*, vol. xiii. (1902), vol. xiv., parts 1 and 2 (1903), from the Department of Agriculture, New South Wales ; "Forest Flora of New South Wales," part i., by J. H. Maiden, F.L.S., Government Botanist, from the author ; *Nature Notes*, January, 1903, from the Selborne Society, London ; *Knowledge*, February, 1903, from the proprietors.

PAPERS.

1. By Mr. S. P. Townsend, entitled "A Trip to Mud Island Port Phillip Bay."

The author, in an interesting paper, which was read by Mr. C. Coles, dealt principally with the bird life of the island, and more particularly with the Storm Petrel rookeries, which, the author stated, were evidently at one time very extensive, but which have been to a great extent destroyed by the guano-diggers. He gave some valuable information as to the habits of these birds and the results of two separate visits to the island, and suggested the advisability of the Government protecting these rookeries from demolition by the guano-diggers.

In the discussion which followed Mr. D. Le Souëf, C.M.Z.S., stated that members would be glad to know that the Government have issued a notice protecting the Petrels and preventing the removal of the soil and guano from the rookeries.

The President and Messrs. F. G. A. Barnard, G. Coghill, A. Coles, and S. W. Fulton also discussed the paper, the latter stating

that the crabs mentioned were probably a species of *Heterograpsus*.

2. By Mr. D. Goudie, entitled "Notes on the Larvæ and Pupæ of Birchip Heterocera," part iii.

The author gave an account of the life-history of the moth *Hyleora dilucida*, Felder, and exhibited a water-colour drawing of the moth, larva, and pupa.

Mr. J. A. Kershaw, F.E.S., in speaking on the subject, drew attention to the close resemblance between *H. caustopis* and *H. eucalypti*, the latter of which is one of the rarest of our Victorian moths. So far as he could find, the National Museum collection is the only Victorian collection which contains Victorian examples of *H. eucalypti*. These specimens were collected by the late Mr. W. Kershaw about thirty years ago, and, as far as he could ascertain, this species had not been taken in Victoria since that time. He mentioned that Dr. Turner, of Queensland, was at present engaged in revising this group, and the results of his work would shortly be published.

3. By Dr. C. S. Sutton and Mr. F. G. A. Barnard, entitled "Among the Alpine Flowers."

The authors gave an interesting account of a visit to the Victorian Alps (Mt. Hotham) and the Buffalo Mountains at Christmas time, mentioning the principal plants and shrubs then in bloom, their observations resulting in several additional species being recorded for the N.E. district of Victoria. The paper was well illustrated by maps, photographs, and specimens.

Messrs. H. T. Tisdall, J. Shephard, and the President congratulated the authors on the splendid results of their trip, and spoke highly of the great trouble they had taken in placing such a large and interesting exhibit, consisting of the plants, &c., collected during their trip, before the meeting.

NATURAL HISTORY NOTES.

Mr. F. C. Christy contributed a note on the English Blackbirds, *Turdus merula*, feeding their young on the larvæ of the Vine Moth, *Agarista glycine*. Mr. G. A. Kearland remarked that the Pallid Cuckoo, *Cuculus pallidus*, was one of our most useful birds for destroying these larvæ.

Mr. Kearland also mentioned that he has four different species of birds sitting on eggs at the present time, and stated that it was rather remarkable that they should be nesting at this time of the year.

EXHIBITS.

By Mr. F. G. A. Barnard.—Living fern, *Lomaria alpina*, from Mt. St. Bernard; geological specimens from summit of Mt. Hotham and the Buffalo Gorge; also maps and photographs in illustration of paper.

By Miss S. W. L. Cochrane.—Native Grinding Stone, found at Tocumwal, N.S.W.

By Mr. A. Coles.—Glossy Ibis, *Ibis falcinellus*.

By Mr. C. French, jun.—Fine specimens of the remarkable Cotton-like Scale Insect, *Pulvinaria tecta*, on Kunzea, from South Gippsland.

By Mr. G. A. Keartland.—Eggs of Wedge-tailed Eagle, one of which is pure white. Both taken from the same nest.

By Mr. F. M. Reader.—Medicinal plants from Minnesota, U.S., America :—*Prunus serotina*, *Veronica virginica*, and *Monarda punctata*. Also the following naturalized plants, new for Victoria :—*Medicago turbinata*, Dimboola ; *Papaver dubium*, Lowan ; *Sisymbrium columnae*, Dimboola and Borung.

By Dr. C. S. Sutton.—Dried plants in illustration of paper, including *Prostanthera walteri*, *Leontopodium catipes*, *Aciphylla glacialis*, and *Epacris mucronulata*.

By Mr. W. Scott.—Butterflies and moths from Ceylon.

By Mr. S. P. Townsend.—Specimens of White-faced Storm Petrel, *Pelagodroma marina*, showing the adult and young in different stages of development, in illustration of his paper.

By Mr. C. Walter.—Plants new for N.W. of Victoria :—*Kochia microphylla* and *Euphorbia drummondii*, collected at Saltwater River, near Maribyrnong Racecourse, by Mr. C. French, jun., February, 1903.

By Mr. G. Weindorfer.—Dried plants in illustration of paper by Dr. Sutton and Mr. F. G. A. Barnard, including *Veronica nivea*, *Baeckea crenatifolia*, *Spiranthes australis*, *Kunzea corifolia*, &c.

By Mr. J. Wilcox.—Sea-horse from southern coast of Tasmania, After the usual conversazione, the meeting terminated.

THE MICRO-FUNGI OF AUSTRALIAN LOBELIAS.

By D. M'ALPINE, Government Vegetable Pathologist.

(Read before the Field Naturalists' Club of Victoria, 9th Feb., 1903.)

THE immediate cause of writing this paper was the finding of nine different kinds of fungi on a series of specimens of a small species of Lobelia kindly forwarded to me by Mr. C. French, jun., who has recently been adding considerably to the micro-fungi of Victoria by his enthusiastic and intelligent collecting.

The Lobelias belong to the natural order Campanulaceæ, and are represented by about 200 species of greenhouse and hardy herbaceous plants, shrubs being very rare among them. They contain the poisonous alkaloid known as lobeline, in the form of a yellow viscid liquid, but this evidently does not prevent them being attacked by fungi.

If we take the *Index Kewensis* as our guide, there are 22 species of this genus in Australia, and of these about one-third, or 7, are found in Victoria. Of the 12 usually given for Victoria 4 are now assigned to the genus *Pratia*, which differs principally from *Lobelia* in the fruit being a berry and not a dry capsule. Further, the *L. browniana* and *L. simplicicaulis* are considered to be synonymous with *L. gibbosa*, Labill. ; so that there remain 7 Victorian species, as follows :—*L. anceps*, Thunb. ; *L. benthami*, F. v. M. ; *L. gibbosa*, Labill. ; *L. microsperma*, F. v. M. ; *L. pratioides*, Benth. ; *L. purpurascens*, R. Br. ; *L. rhombifolia*, De Vriese.

According to Saccardo's comprehensive work, the "Sylloge Fungorum," only 17 species of fungi are recorded on this genus of plants ; and of these only one has hitherto been found in Australia, viz., *Puccinia aucta*, Berk. and F. v. M.

Now, there are 11 different species of fungi to be recorded on *Lobelias* for Australia alone, and when I state that 9 of them have to be added from having been found on a single species of *Lobelia* (*L. gibbosa*, Labill.) collected during the past season by a single member of this Club, you may be able to form some faint idea of what a wealth of new forms awaits the investigator in this fascinating field of fungi, and how much still remains to be done in connection with the fungus-flora of Australia.

Now let us take these 11 species of fungi and see how they are distributed among the different divisions of this great group of plants. I have no intention of framing a classification of fungi, but simply to place these forms in their respective families, and give some idea of their affinities.

- UREDINES — 1. *Puccinia aucta*, Berk. and F. v. M.
 2. *Cæoma lobeliæ* (Thuem.), M'Alp.
- SPHÆROPSIDES — 3. *Phoma lobeliæ*, B. and Br.
 4. *Macrophoma brunnea*, M'Alp.
 5. *Coniothyrium olivaceum*, Bon.
 6. *Hendersonia lobeliæ*, M'Alp.
 7. *Rhabdospora lobeliæ*, M'Alp.
 8. *Pestalozzia citrina*, M'Alp.
- HYPHOMYCETES — 9. *Fusarium gracile*, M'Alp.
 10. *Septotrichum lobeliæ*, M'Alp.
 11. *Sclerotium*.

It will be noted that each species belongs to a different genus, and they are all found in Victoria with the exception of *Puccinia aucta*, which is a South Australian form, and *Cæoma lobeliæ*, which occurs in New South Wales as well as in Victoria. Among the Uredines or Rusts there are two species. The one is a *Puccinia*, and only found at Port Lincoln on *Lobelia anceps*.

Through the courtesy of Mr. J. G. Luehmann, F.L.S., I am able to show you this unique specimen from the National Herbarium.

The other is a Cæoma, and it is interesting as being one of the only two recorded for Australia. Cæoma-forms are just *Æcidia* without the cups or pseudo-peridia, and represent one of the stages of the development of rust-fungi.

It has been experimentally proved that a number of these Cæoma-forms represent a stage in the life-history of the *Melampsoreæ*, but none of this genus has been found as yet on *Lobelia*. From their general appearance and close resemblance to *Æcidia* it is not surprising that these Cæoma-forms are mistaken for them, and *Æcidium lobeliae*, Thuem., now turns out to be a Cæoma.

The Sphærospides are a group of imperfect fungi, so called because they are assumed to be the imperfect stage of a higher group in which the spores are not only contained in a capsule or perithecium, as in this instance, but are also enclosed in a bag or ascus inside the perithecium. Although the connection between the so-called lower and higher forms has been proved in a few cases, yet in the great majority it has not been traced.

On our *Lobelias* there are six genera in this group, representing as many species, and they have either colourless or coloured spores, which are either continuous or divided by transverse partitions or septa.

The Hyphomycetes or Moulds are represented by two species. The one, *Fusarium gracile*, is ruddy in the mass, while the slender, graceful conidia are colourless. The other is a black fungus, and the most common of all on *Lobelia gibbosa*, yet it is so peculiar in its structure that I had to place it in a new genus, named *Septotrichum* from the dark-brown setæ or hairs which cover it being septate.

There still remains to be described a hard, black, irregular body, known as a Sclerotium. On some of the whitened stems found by Mr. French at Carrum there were black bodies, either naked or covered, round or irregular in shape, and varying in size from $\frac{1}{2}$ mm. to 2 or 3 mm. in length. As the stems decay these bodies are set free and lie on the ground until growth commences again, and then they produce the reproductive stage of the fungus. When cut across they are seen to be composed of innumerable fungus-filaments, closely compacted, whitish in the interior, but dark toward the outer surface. These Sclerotia or hard bodies represent a resting stage of the fungus in which the mycelial threads are twisted round each other like a ball of worsted and rendered compact. They are usually of a dark colour on the outside and more or less white within, and vary in size from very small shot to that of a child's head.

Formerly this was reckoned a genus by itself, but it is now

known simply to represent a stage in the history of a fungus in which it remains dormant, and goes into winter-quarters at the end of the growing season. There are quite a number known in connection with various fungus diseases, and the one belonging to *Sclerotinia sclerotiorum*, Masee, is considered to surpass any other parasitic fungus in the variety of species it attacks and kills.

A well-known form is the Ergot of Rye, but perhaps you are more familiar with the "Native Bread," which is the Sclerotium-stage of what is now called *Polyporus mylittæ*.

The distribution of these fungi is rather interesting. *Puccinia aucta* is only known from Australia on the single species *L. anceps*, and in fact from a single locality, Port Lincoln. Since the host-plant on which it occurs is found in all the Australian States, as well as in New Zealand, South Africa, and South America, I see no reason why this rust should not be found elsewhere if carefully searched for.

Caoma lobeliae is the *Æcidium lobeliae*, Thuem., and the *Æcidium microstomum*, Berk. It is given in Cooke's "Hand-book of Australian Fungi" as the *Æcidium*-stage of *Puccinia aucta*, but that connection must now cease. It likewise occurs on a single species of *Lobelia* (*L. pratioides*), although it is also found on *Pratia erecta*, *P. pedunculata*, and *P. platycalyx*. It has been found both in Victoria and New South Wales. The remaining nine species of fungi are confined to *L. gibbosa*, with the exception of *Coniothyrium olivaceum*, which is common on a great variety of plants in different parts of the world, and were all discovered at Sandringham or Carrum in December and January.

I have confined my attention in this paper to a single genus of plants, and, although limited in its scope, it shows how rich and varied our fungus-flora is, and also indicates that a number of our native plants which at present are supposed to be free from fungi may, by the intelligent collector, be made to yield a rich harvest.

But while individual genera are thus studied, it is more satisfactory from a scientific point of view to take some well-defined family of plants and see the assemblage of fungi which affect it as a whole. This is at present being done in the family of orchids, and Mr. French, jun., has already added several to the list.

It is commonly stated that there is no family more free from the attacks of parasitic fungi than the orchids, owing to their generally hard leaves being furnished with a compact epidermis, a very thick cuticle, and very small stomata, but I find that even here they are not so scarce when particular attention is directed to them.

If this brief account of the fungi found on our Australian

Lobelias should lead to more attention being paid to the fungus-parasites which affect our native vegetation, then I will feel amply rewarded for the time bestowed upon their examination.

NOTES ON THE GEOLOGY OF KING ISLAND.

BY A. G. CAMPBELL.

(*Read before the Field Naturalists' Club of Victoria, 9th Feb., 1903.*)

IN November, 1887, an expedition consisting of some twenty-six members of this Club visited King Island, in Bass Strait, about 50 miles to the south of Cape Otway. The reports published in the *Victorian Naturalist* of January, 1888, show that the only regret was that more time could not be given to the geology of the island.

A few observations which I was able to make during a recent visit, I trust will be of some service, not only from an economical point of view, but also in making more complete the said reports of the fifteen-year-ago expedition.

Between then and now King Island has established itself in the industries of cattle-rearing and dairy farming, and has become a very valuable asset to Tasmania. The natural herbage and scrub gave little promise of the soil's capacity to bear such magnificent pasture as is now found throughout the length and breadth of the island. It should, of course, be recognized that the governing influence in the productiveness of any tract of country is just its geological formation, plus the amount of that most essential thing, rain or drainage water, with which it is blessed. Some formations deliberately waste this magic substance, and no amount of man's ingenuity can save sufficient to keep the surface soil productive; but, on the other hand, of all the areas where Nature assists man by conserving the waters for him, it is doubtful if any are so favoured as King Island. Here geology shows as plainly as anywhere in the southern part of this continent its beneficent connection with agriculture.

Looking at a map of Bass Strait, it is seen that on the eastern side a continuous chain of islets runs from Wilson Promontory to the north-east point of Tasmania, and we believe that this is all that now remains of a once existing land bridge between the two. On the west islets again lead out from Tasmania as far as King Island, but between there and the mainland at Cape Otway is a deep strait, doubtless marking the place where the first disruption in earlier geological times took place.

All the islands, both on the east and on the west, are built of the one class of material—igneous granitoid rock—(this fact is strong evidence of their connection once upon a time).

The base rock of King Island is no exception—it is granitoid,

and the platform, as it were, of this material rises to just above sea-level. On this rests a Tertiary formation of dune sand very similar to what is found about Sorrento. This has been derived from some old sea-shore where an ancient sea pounded up shells with the grains of quartz and felspar derived from the breaking down of the granite, and strong winds took the smaller pieces away and piled them up high and dry. The prevalent winds are from the west and south-west, and have been so for ages, for the dune sand (which had its origin on the west side only) now completely covers the granite platform, and is advancing into the sea on the eastern side of the island. The base rock, as would be expected from this, is exposed at the seashore for practically the whole length of the west coast, and at any part its hard and varied character can be seen. Much of it shows gneissic characters; it is in layers, or bedded, as if it underwent movement before thoroughly cooled. The gneiss gives an indescribably wild and rugged coast-line standing out in many hard ridges and sharp points, cleft by deep gulches, and guarded by many outlying reefs. In great contrast is the purely granite coast where beautifully rounded and tumbled boulders are found. To see what variety there is in the graintoid material, one has only to examine perhaps 100 yards of the coast where the foliated rock appears. Beds of gneiss, very fine in the grain, are commonest, but between them will be found layers of coarse admixtures of quartz and mica, of quartz and felspar, and of quartz and felspar with hemihedral crystals of tourmaline, some fine like pins and others the thickness of a finger, while thrust up between or into these beds are bosses of granite and dykes of a very fine-grained rock.

The platform of base rock, however, on the west coast averages only 10 feet above sea-level, though at one place inland it rises into a hill 100 feet or more. In some low-lying places the granite is decomposed to a gritty clay, from which bricks have been made. The influence of this platform on the drainage water can easily be imagined. It forms an impassable barrier, effectually preventing it soaking away to unknown depths. Thus lagoons in plenty are formed in low-lying places by the underground waters soaking in laterally through the loose sand dunes. In two or three specially favoured places the granite outcropping around the margins proves them to be natural reservoirs set in exposed depressions of the bed rock. Then, at certain points, the overflow from the lagoons filters away and finds outlet to the sea, sometimes by running streams, but more frequently by percolating beneath the sand dunes again and trickling out over the granite just above high water mark in many clear springs. The largest sheet of water is in the north, and well worthy of the name of Big Lake, for it is 700 acres in extent and of considerable depth.

This simple geological formation thus endows King Island with a magnificent supply of good water within easy reach. In some wells, however, brackish water is found, but as these may be quite close to fresh and pure water they seem to prove that there are pockets in which the saline material from the soil is concentrated. If pumped out they ultimately give good water.

In the south of King Island the geology is more varied. Two of the rivulets have eaten their way down and exposed what is taken to be Silurian sandstone, while the highest hill, Mount Stanley, 700 feet, is said to be capped with a thin layer of basaltic rock ; but I had not the opportunity of examining these formations.

Over the surface of the island the dune sand deposit, which must have been of much greater thickness, is carved down by the action of streams and of the wind itself which originally built it up, and in the sides of the valleys is found hard limestone chemically formed by the action of percolating water collecting the lime from the comminuted shell so abundant in the sand, and depositing it lower down in the formation. At a place called "Dripping Wells," in the south-west, the limestone is found at the seashore in an outcrop 20 or 30 feet high and 150 yards long. Water has so eaten out the base that caves are formed in which pretty stalactitic and stalagmitic deposits of lime are seen.

The sand dunes near the coast, which reach to 200 feet in height, being higher (and younger) than those further inland, give good protection from the prevalent strong winds, and allow of vegetation thriving. But especially in exposed positions is the loose material still liable to be moved by the wind ; sand-blows are started, and if not attended to and pegged down with brush-wood whole hills might gradually dribble away. That movement such as this has been frequent in past times is sufficiently proved by finding buried land surfaces in the sections by the roadside, and on the other hand by tubes of limy secretion which were deposited round tree roots, now rotted out, standing white and gaunt above some of the present sand blows. This movement, too, has been undoubtedly responsible for the holding up of water in places where trees formerly grew, and as a result acres of gum-tree butts are, at two places notably, in the north and in the centre, now standing dead in several feet of water.

In the pastures of King Island two introduced plants thrive amazingly—a grass, *Bromus sterilis*, and a trefoil, *Melilotus parviflora*. So well do they grow that they can be cut for hay or ensilage with as much ease as sown crops or cereals on ploughed land. The secret of the good growth lies in the fact that the loose soil, rich in lime and plant foods, is kept ever at the service of the plants by the grand supply

of water. Heavy rain soon disappears to lower levels, and is not allowed to saturate and sour the soil unduly, while from these lower levels in summer the water is easily attracted back again to the surface by the sun's heat in quantities sufficient for the plants' uses. Thus the soil, which without this water would be a desert half the year, becomes a paradise for the island cattle.

A TRIP TO MUD ISLAND, PORT PHILLIP BAY,
WITH NOTES ON THE WHITE-FACED STORM-
PETREL, *PELAGODROMA MARINA*.

By S. P. TOWNSEND.

(Read before the Field Naturalists' Club of Victoria, 9th March, 1903.)

BETWEEN Christmas and New Year, having heard from the fishermen that "Storm Petrels" bred on Mud Island, I determined to go down there and ascertain approximately the numbers of birds and extent and condition of the rookeries. Sailors as a rule have never heard the name petrel applied to these birds, but always call them "Mother Carey's Chickens," and have a superstition that their appearance forebodes a storm.

We set sail from Schnapper Point (Mornington) in the early hours of the morning, and with a fair wind made the island in about three hours' sailing. Mud Island is situated in Port Phillip Bay, about 18 miles south-west from Mornington and 5 north-east from Queenscliff. It is an irregular oval, with a shallow lagoon in the centre, with creeks running out of it. The island itself is about three miles in circumference, and the soil consists of sand and beds of cockle shells, and on the surface this is in a loose, friable state, but lower down is a hard conglomerate of shells and sand (see exhibit). The vegetation consists of different species of Saltbush, Currant Bush, and Pig-face weed (*Mesembryanthemum*), with some stunted Lightwood (*Acacia melanoxylon*) scrub at the north end. There are shallow tidal banks round the island, and on some of these sea-grass grows, and forms the feeding ground of a large number of Swans. The lagoon in the centre goes partially dry at low water, and at the time of my visit was covered with flocks of *Limicolæ* of a great many different species. On a sand-bank, a few hundred yards from the shore, there were eight Pelicans, which seemed to sleep all day, but occasionally woke up and gave a tremendous yawn in a most ludicrous manner. There are a few rabbits on the island, which evidently live on bushes and Pig-face, as there is no other feed and absolutely no fresh water. The only land birds I observed were the Grass-bird (which is fairly plentiful in the low bushes), White-fronted Chat, Sparrow, Meadow Pipit, and Swamp-

Hawk. The sparrows were building large nests, composed principally of sea-weed lined with sea-birds' feathers, in the Light-wood scrub, and what attracted my attention to them was the tremendous noise they were making; on looking into the scrub I saw some dark object moving backwards and forwards, which I ascertained to be a hawk of some kind. I fired a shot and scrambled in and discovered a fine Gould's Harrier, which had evidently been looking out for young sparrows. I was interested in watching through the glass a little Red-capped Dotrel feeding. It would run a few steps, then scratch with one foot in the sand. The scratching was done so quickly that the leg looked as if it were quivering. The Storm Petrel "rookeries" were evidently very extensive at one period, but the digging up of the surface for guano has destroyed a large portion of them, and will in time destroy the whole if the taking away of the surface is not prohibited. Though there was, I believe, some true guano on the island years ago, what the boats now take is only a mixture of sand and shell, and in my opinion should be stopped if the rookeries are to be preserved. One large rookery is in process of demolition at the present time. The principal rookeries are situated on the east and south sides; some are amongst Blue-bush scrub, and others amongst Ice-plant and Native Spinach, *Tetragona expansa*. There was a species of land crab which had holes like Petrel burrows amongst the stunted bushes, but on a lower level to the rookeries. Some of the petrel burrows, however, contained crabs, which may go into the holes and eat the young birds; anyhow they seem quite large enough to do so. The White-faced Storm Petrel, as may be seen from specimens on the table to-night, is a very small bird to withstand the buffeting of fierce gales. It is only 8 inches in total length, and weighs but one ounce and three-quarters, but the wing expanse stretches to 17 inches. I have myself seen the bird following a ship whilst running the easting down between the Cape of Good Hope and Australia, and they have a habit of flying with their legs dangling down, seeming to literally walk on the waves, and I take it that they got the name petrel in reference to St. Peter's walking on the water. Pétrél in French is the diminutive of the name Peter.

The nesting burrows are from one to two feet deep, but some I could not bottom with my whole arm thrust in up to the shoulder. The holes contained young at the time of my visit, one in each hole; but in one hole I found two. The second bird probably strayed in, as some of the holes run into one another, they are so close together, the ground being fairly riddled. Unlike the Mutton-bird, no attempt at a nest is made. The young birds, like all petrels, are very oily; one I obtained for a specimen (see exhibit) had half an egg-cupful of oil in its

stomach. I have read that some years ago in the remote islands of the Hebrides, the inhabitants actually formed them into candles by passing a rush through the body and out at the beak, which is found to burn as well as if dipped in tallow or any other grease.

I was anxious to ascertain at what hour the parent birds returned from sea, as the holes were only tenanted by the young. I waited at dusk, thinking they would come in about the same time as the Mutton-birds; however, there was no sign of them until it was pitch dark, showing that they are a more timid bird than their dusky relative. It was after nine before I saw a sign of a bird, and then a couple flew close to me. It was too dark then to make any observations, so I set off back to the boat. Whilst walking back alongside a shallow creek that led to a larger rookery, I heard what I took to be fish rising; the fisherman who was with me, however, said he thought they were Mother Carey's Chickens, striking the water with their feet as they flew over it. By striking several matches at once, we saw that they were indeed the birds we were looking for, returning in the dark to their young. I learned from my companion that when he has been seining round the island the birds have frequently struck the hauling line of the net at night.

The night of my visit being too dark to make observations, I determined to make another trip whilst there was a good moon. Therefore, accompanied by Mr. Clifford Coles, I left Mornington on 16th January. We had a grand moon on the night of our visit, and at dusk we took up a position on the rookeries to wait for the birds. The first bird was seen at a quarter past nine, and they came in a few at a time until near ten o'clock, when there were large numbers arriving. They circled round the spot several times, evidently to identify their particular burrow, and then noiselessly and gracefully alighted within a foot or two of the entrance, and, finding it, burrowed energetically for a moment or two and disappeared below. The birds flew with a soft flight, making scarcely any noise, and gave no call, so that on a dark night, with a breeze, one would scarcely know there was a bird about.

Shortly after ten we went and tried a few holes to see if the old birds were in, but, after trying several and only finding young, we soon came to the conclusion that the petrels merely stayed in the burrows long enough to feed the young one, and then flew away to sea. This was verified in a few moments, as I saw a bird enter a burrow close by. The young one made a noise like a chicken the whole time it was evidently being fed. After the old bird had been in the nest exactly seven minutes, it came out and flew away. Odd birds came in until twelve o'clock, and apparently stragglers continued to arrive later, as on waking up

at two a.m. we still saw an odd bird or two, but I have an idea that these were birds too timid to enter their burrows, alongside which we were rolled up in our rugs. Being curious to know what the young petrels were fed on, we captured a bird just as it was entering a burrow, killed it, and took from its throat a pasty substance which looked and smelt not unlike the bloater paste of commerce. We also took a young bird from a burrow, and found its stomach abnormally extended with this substance, the only solid portion of which we identified as being part of a small shrimp. When the birds alight at the burrows they commence to scratch exactly like the Mutton-bird does. Query: Does the Mutton-bird only come in for a few minutes every night to feed the young, and then off to sea? We also ascertained that the Storm Petrel, unlike the Mutton-bird, can rise readily from the ground, its long legs accounting for this, the only impetus necessary being a hurried step or two with wings outstretched.

A fisherman lately brought me a Storm Petrel that he had found in his boat at the Mornington pier. This bird must have missed the island during the night, and they seem to have a habit of hiding themselves in the daytime, as I kept it in a room, and it would burrow into the curtain in the day, but at night became quite lively. I took it down on the rocks at night to let it go, but its wings were probably too stiff to fly, although it would stand with wings outstretched and quivering.

There were three boats taking away soil at the time of our visit to Mud Island. The men stated that they paid a license of £10 each for three years—a trifling recompense for the loss of the breeding ground of such an interesting ocean wanderer as the Storm Petrel. We roughly estimated that about five thousand pairs of birds nested on the island.

Coming home in the boat to Mornington we sailed by a flock of about three hundred Mutton-birds. This is the first time I have seen these birds in Port Phillip.

There were several Harriers flying about the island, and they, no doubt, kill a number of young petrels. I disturbed one in the act of devouring a bird, and found the remains of several freshly killed. The hawks seemed to hover about the rookeries, watching a chance to seize any young bird foolish enough to come to the mouth of the burrow.

I identified the following species of birds on or around the island:—

Gould's Harrier	...	...	<i>Circus gouldi</i>
Grass-bird	...	...	<i>Megalurus gramineus</i>
White-fronted Chat	...	...	<i>Ephthianura albifrons</i>
Meadow Pipit	...	...	<i>Anthus australis</i>
Turnstone	...	...	<i>Arenaria interpres</i>

Pied Oyster-catcher	...	<i>Hæmatopus longirostris</i>
Lesser Golden Plover	...	<i>Charadrius dominicus</i>
Red-capped Dottrel	...	<i>Ægialitis ruficapilla</i>
Barred-rumped Godwit	...	<i>Limosa novæ-zealandiæ</i>
Curlew ...	...	<i>Numenius cyanopus</i>
Little Stint	...	<i>Limonites ruficollis</i>
Sharp-tailed Stint	...	<i>Heteropygia acuminata</i>
Curlew Stint	...	<i>Ancylochilus subarquatus</i>
Knot ...	...	<i>Tringa canutus</i>
White-faced Ternlet	...	<i>Sterna nereis</i>
Crested Tern	...	<i>Sterna bergii</i>
Silver Gull	...	<i>Larus novæ-hollandiæ</i>
Pacific Gull	...	<i>Gabianus pacificus</i>
Richardson's Skua	...	<i>Stercorarius crepidatus</i>
White-faced Storm Petrel	...	<i>Pelagodroma marina</i>
White-fronted Heron	...	<i>Notophoxys novæ-hollandiæ</i>
Pelican ...	...	<i>Pelicanus conspicillatus</i>
Black Cormorant	...	<i>Phalacrocorax carbo</i>
Pied Cormorant	...	<i>P. hypoleucus</i>
Hoary-headed Grebe	...	<i>Podiceps poliocephalus</i>
Black Swan	...	<i>Chenopsis atrata</i>
Musk Duck	...	<i>Biziura lobata</i>
Sparrow (introduced)	...	<i>Passer domesticus</i>

NOTES ON THE LARVÆ AND PUPÆ OF BIRCHIP HETEROCERA.

PART III.

BY D. GOUDIE.

(Read before the Field Naturalists' Club of Victoria, 9th March, 1903.)

HYLEORA DILUCIDA, Felder.—The larvæ of this moth are capable of doing considerable damage to the various species of eucalyptus, especially the Sugar Gum, *Eucalyptus corynocalyx*, which is grown for shelter. They are liable to be passed over on account of their resemblance to the leaves, but a careful search amongst the half-bared twigs is generally sufficient to unearth the culprit. In August and September, 1901, I procured a fair number of these larvæ—the first, which fed ravenously, and attained a large size, entering the earth I had provided on 25th September, the change into the pupal stage taking place ten days later. The last of the caterpillars, of which I had over thirty, pupated on 28th October. The first emerged on 14th March, 1902, and the last on 21st April.

The full-grown larva is nearly three inches in length, of a bluish-green colour, rather square-shaped on the back, with a whitish, serrated, sub-dorsal ridge. There are two large spots on

the ventral surface near anal end, one-half of each being yellow, or sometimes red, and the other half velvety black. These are greatly distended when the caterpillar is alarmed. The legs, pro-legs, and the little-used hind claspers are dark red.

The pupæ are dark brown or black in colour, generally from $1\frac{1}{4}$ to $1\frac{3}{4}$ inches in length, and are contained in large, flat, oval cocoons, made of sticks, leaves, and other rubbish fastened together with coarse web. They are generally placed close to the surface, and sometimes even the chrysalis inside is visible from above.

To-night I have placed on exhibition water-colour drawings by my brother (Mr. J. C. Goudie), of the larva, pupa, and imago of this species, to enable members to follow the description more closely.

NOTE.—Since writing above, the drought has affected this and many other species to a wonderful extent. Some of these which were quite common before are now apparently extinct in this district.—D.G.

BLACKBIRDS USEFUL IN GARDENS.—Members of the Field Naturalists' Club may be interested in hearing that my gardener has watched a pair of English Blackbirds, *Turdus merula*, last week clear the vines in the gardens of my neighbours as well as my own of the Agarista caterpillars, carrying two or three at a time in their beaks to their young in a nest in a tree close by. Lately I have observed six Blackbirds every evening in my garden flying to these vines, and have examined the vines, and find them free from caterpillars, whilst in previous years the vines have been denuded of their leaves. The grapes (unripe) are untouched. The Bronze Cuckoo is the only other bird I have ever seen eat this caterpillar. The Agarista caterpillars appear in early spring and destroy the vine blossoms, and throughout the summer, so that poisons are useless unless applied frequently. If any bird will keep the vines clear it would be a boon to the vigneron.—F. C. CHRISTY, South Yarra.

“FAT-HEN.”—It would seem, from notes received from several correspondents, that this name is applied to various species of the genus *Chenopodium*, “Goose-foot,” in different parts of Australia. Bentham and Mueller give it as the vernacular name of *C. auricomum*, Lindley, indigenous in all the States except Tasmania.

“MONOMEETH PAREINE.”—This name does not seem to be in recent use, but from the rest of the paragraph quoted (*Vict. Nat.*, xix., p. 134), the description seems to agree best with *Callistemon salignus*, Candolle, which, doubtless, was plentiful along the lower Yarra at the time mentioned.

HONOURS.—Mr. A. W. Howitt, F.G.S., an honorary member of the Field Naturalists' Club, has recently been elected an honorary member of the Anthropological Institute of Great Britain and Ireland, in recognition of his distinguished work in Australian ethnology.

Mr. A. J. Campbell has had further honours conferred upon him in being elected a Corresponding Fellow of the American Ornithologists' Union, in recognition of his devotion to Australian ornithology.

MICROSCOPICAL.—The opening meeting of the fourth winter session of the Hawthorn and Camberwell Microscopical Society took place recently, when the president, Mr. O. A. Sayce, gave an interesting demonstration on the culture of Bacteria, which was very fully illustrated by specimens, &c. This society, which meets monthly at members' houses, includes several members of the Field Naturalists' Club among its members, and, in seeking to provide mutual help to workers with the microscope, takes up a position useful to many nature students.

MINAHS AS VERMIN DESTROYERS.—I was much surprised on Sunday last to see a Minah in my garden with a live mouse in its beak. I watched the bird for a few moments, and saw it carry the mouse to a bricked path and knock the mouse on it several times. In order to make sure, I frightened the Minah away, and found the mouse hardly able to crawl. Leaving the mouse in the spot where the bird had left it, I went away some distance. The Minah returned and finished the mouse off. Shortly after the Minah returned with its mate, and one of them caught another mouse, and they killed it in the same manner. I took the two dead mice away, and about an hour afterwards I found a third, apparently killed in the same way. The mice came from a shed in the garden in which the fowls' food is stored.—FRED. S. BRYANT. 64 Barker's-road, Hawthorn, 5th February, 1903.

THE EMU.—The April number of this magazine, being the concluding part of the second volume, is to hand, and contains a number of interesting articles. An additional attraction is the first coloured plate issued. This is devoted to figures of three of our rarest Blue Wrens—viz., *Malurus elizabethæ*, *M. whitei*, and *M. assimilis*—and has been excellently produced by the artist, Mr. H. Grönvold, and the printers, Messrs. Mintern Bros., of London. The colours of the birds being so brilliant, the plate is a particularly attractive one.

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